PRINTSERVER
Installation Manual

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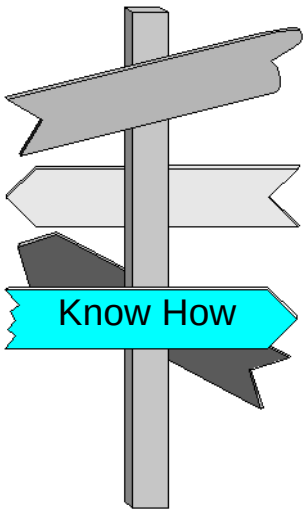
CHAPTER 1

Network Know How



This chapter contains information concerning the following topics:

- Basic Terminology
- Basic TCP/IP Terminology
- DHCP
- Rendezvous / ZeroConf
- SNMP

1.1 Basic Terminology

In order to install your print server, you will need various data and parameters. This information will be explained in this section.

1.1.1 Hardware address

Hardware Address Structure

A print server is addressable by means of its world-wide unique hardware address. This address is commonly referred to as the MAC or Ethernet address. The manufacturer has defined this address in the hardware of the print server. The address consists of 12 hexadecimal numbers. The first six numbers represent the manufacturer, while the last six numbers represent the individual card.

Where Can I Find the Hardware Address?

The hardware address of your print server is on a label pasted onto the actual card or the box or pocket print server housing and can be read easily.

On the print server, you will find a hardware address of '00c0eb0001ff.' Here, '00c0eb' identifies the manufacturer, while '0001ff' is the number of your print server. If your print server has already been installed, you can find the hardware address using either the print server homepage, the PRINTSERVER-NetTool, SNMP, or the status page.

Spelling of the Hardware Address

You must enter the hardware address during the installation of the print server software. This entry varies depending on the operating system in use:

Operating system	Representation	Example
Windows	Hyphens	00-c0-eb-00-01-ff
UNIX	Colons or periods	00:c0:eb:00:01:ff or 00.c0.eb.00.01.ff

1.1.2 Print Server Name

Name Structure

The print server name is made up of two letters 'IC' and the print server number. The print server number consists of the last six numbers of its hardware address.

Example:Hardware address: 00:c0:eb:00:01:ff
Print server name: IC0001FF

Where Do I Find the Name?

The print server name can also be found using either the print server homepage, the PRINTSERVER-NetTool, SNMP, or the status page.

Apple and Novell Name

In Novell and Apple networks, the Novell orApple name is used. Upon delivery, the print server name corresponds to the Novell or Apple name. By means of the print server homepage, the PRINTSERVER-NetTool, or parameter transfer via FTP, it is possible to change the Novell or Apple name.

1.1.3 Logical Printers

What Are Logical Printers?

Logical printers are so-called pre-installed print server filters. Print data is interpreted according to the set logical printer. The print server has eight available logical printers. Each logical printer has a different function.

Which Logical Printers Are Available?

The following pre-defined logical printers are available:

No.	Preset function
1	Default setting
2	Changes Line Feed (LF) to Carriage Return with Line Feed (LF+CR)
3	Converts ASCII data into PostScript data
4	Prints a banner page in Novell networks or if the LPD protocol is used
5	Prints all data in hex dump mode. Hex dump mode is mainly used to search for errors in print data. The data is printed as a byte in hexadecimal form instead of letters and numbers. Printer control commands are printed as hexadecimal values and do not influence the printout in any way.
6	Not assigned
7	Not assigned
8	Supports the RSO Spooler (BS2000)

Logical Printers with Box Print Servers

With box print servers, logical printers are used to configure the port which will be addressed (LPT1, COM1 or USB1):

Logical printer	Option 1	Option 2
1	LPT1	LPT1
2	LPT2	USB1
3	LPT3	USB2
4	COM1	USB3

Logical printer	Option 1	Option 2
5	LPT1	USB4
6	LPT1	LPT1
7	LPT1	LPT1
8	LPT1	LPT1

Option 2 allows you to connect a hub to the USB port. In this case, four printers can be administered via USB 1 through 4 by means of the logical printers.

Logical Printer Configuration

You may change the function for every logical printer by changing the corresponding configuration parameter. These parameters can be configured using either the print server homepage, the PRINTSERVER-NetTool, SNMP, or the FTP parameter transfer.

Addressing Logical Printers

Depending on your system, logical printers may be addressed in various ways.

Windows

In Windows networks, you may use the corresponding TCP/IP ports instead of the logical printers. For more information, please read the section "TCP/IP Ports" on page 1-15.

Novell

In Novell networks, the logical printers are addressed with '#1' through '#8'.

UNIX

In UNIX networks, the logical printers are addressed with 'lp1' through 'lp8'.

FTP

In the case of an FTP print data transfer, the logical printers are addressed with 'lp1' through 'lp8'.
Example: put <file name> lp1

Mac OS	In Mac OS X networks, the logical printers are addressed with lp1 through lp8. No logical printers are available in Mac OS 9/8 networks.

1.2 Basic TCP/IP Terminology

In Windows and UNIX networks, TCP/IP is used for communication between the various participants. In order to install your print server in TCP/IP-based networks, you must enter certain data and parameters. This information is described in the following section. If you are already familiar with TCP/IP, please read the "Installation in Windows Networks" chapter on page 3-1 or the "Installation in UNIX Networks" chapter on page 5-1.

1.2.1 IP Address

What is an IP Address?

The IP address is the unique address of each node in a network, i.e. an IP address may occur only once on a local network. The system administrator usually assigns the IP address. The address must be saved in the print server to make sure that it can be addressed within the network. In this Installation Manual, the IP address '192.168.0.123' is consistently used as an example.

IP Address Structure

IP addresses always consist of four address groups. Each group is separated from the next group by a period. Every IP address is divided up into the network ID and the user ID. This division is primarily determined by the network class.

The following network classes can be distinguished:

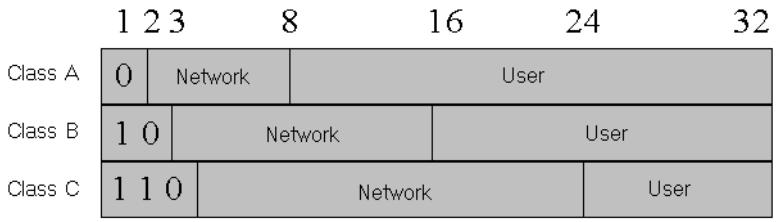


Fig. 1-1: TCP/IP network classes

All IP addresses assigned in a logical network must belong to the same class.

Example

You have applied for a class C network ID and receive network ID '192.168.0.' Due to the fact that user IDs '0' and '255' are reserved for broadcast addresses, a valid IP address must lie somewhere between '192.168.0.1' and '192.168.0.254', such as '192.168.0.123.'

ZeroConf IP address range

The address range 169.254.0.1 to 169.254.255.254 is reserved for the automatic assignment of IP addresses via ZeroConf. For more information, please read the section "Rendezvous / ZeroConf" on page 1-21.

1.2.2 Methods of Saving the IP Address in the Print Server

If you use TCP/IP as network protocol, you first have to save the IP address in the print server. This is irrespective of whether you use Windows, UNIX, or Apple networks.

Once the print server is connected to the network and switched on, the print server checks whether an IP address can be obtained from a DHCP server or boot protocols. If this is not the case, the print server assigns itself an IP address via ZeroConf. This IP address is taken from the address range 169.254.0.1 to 169.254.255.254 which is reserved for ZeroConf.

In many cases, the print server is to be integrated into the actual network after the automatic configuration via ZeroConf in the 169.254.x.x segment. To this end, a different IP address must be saved in the print server. In this Installation Manual, the PRINTSERVER-NetTool is always used for saving the IP address.

The following possibilities for saving the IP address are available:

- DHCP
- The BOOTP Boot Protocol
- The RARP Boot Protocol
- The arp and ping Commands
- PRINTSERVER-NetTool

1.2.2.1 The BOOTP Boot Protocol

If your network uses the boot protocol BOOTP, the '/etc/bootptab' file must be added. This file is located on the host running the BOOTP daemon. The '/etc/bootptab' file contains a permanent copy of the assignment of the host name and the IP address to the hardware address.

Make sure that:

✓ The 'BOOTP' parameter has been activated (see status page).

What Happens When the Print Server is Turned on?

Once the print server has been turned on, it asks the BOOTP for the IP address and the host name. The answer of the BOOTP host server, which contains the IP address, is sent as a data packet and saved in the print server.

What Happens When Printing?

During the installation of the print server, its host name is displayed on the monitor of the computer intended for printing. The computer finds the IP address of the print server by means of either the local 'etc/hosts' file or the DNS host. The print data can then be sent to this IP address.

You can also enter the IP address instead of the host name during the print server installation. In this case, you can send print data directly to the IP address.

1.2.2.2 The RARP Boot Protocol

If your network uses the RARP boot protocol, either the '/etc/ethers' file or the '/etc/rarpd.cf' file must be added.

The choice of which file to add depends on how the RARP network service was implemented on your UNIX system. For more information, please read the section concerning 'rarpd' in your UNIX documentation.

Both files are located on the host running the RARP daemon. The files contain a permanent copy of the assignment of the host names and the IP address to the hardware address.

Make sure that:

✓ The 'RARP' parameter has been activated (see status page).

What Happens When the Print Server is Turned on?

Once the print server has been turned on, it asks the RARP for the IP address and the host name. The answer of the RARP host server, which contains the IP address, is sent as a data packet and saved in the print server.

What Happens When Printing?

During the installation of the print server, its host name is displayed on the monitor of the computer intended for printing. The computer finds the IP address of the print server by means of either the local 'etc/hosts' file or the DNS host. The print data can then be sent to this IP address.

You can also enter the IP address instead of the host name during the print server installation. In this case, you can send print data directly to the IP address.

1.2.2.3 The arp and ping Commands

By means of the 'arp' and 'ping' commands, you can save the IP address in the print server.

If the print server already has an IP address, the 'arp' and 'ping' commands cannot be used to save a new IP address in the print server. However, an IP address from the address range 169.254.0.1 to 169.254.255.254 which is reserved for ZeroConf can be overwritten by means of the 'arp' and 'ping' commands.

Use the 'arp' and 'ping' commands to save the IP address if your network has no superordinate management of IP addresses and host names, such as a DNS or WINS server.

The 'arp' command is used for editing the ARP table. The 'ping' command sends a data packet with an IP address to the hardware address of the print server. If the data packet has been successfully

sent and received, the print server permanently saves the IP address.

The implementation of the 'arp' and 'ping' command depends on the system used. For more information, please read the relevant section in the documentation of your operating system.

Make sure that:

✓ The 'ARP/PING' parameter has been activated (see status page).

Proceed as follows:

1. Edit the ARP table:
   Syntax: arp -s <IP address> <hardware address>
   Example: arp -s 192.168.0.123 00-c0-eb-00-01-ff
2. Assign a new IP address to the print server:
   Syntax: ping <IP address>
   Example: ping 192.168.0.123

Trouble Shooting

The 'Addition failed' error occurs when you use the 'arp' command. This error informs you that the ARP table is empty and that the new entry cannot be added. This problem occurs with certain operating systems such as all Microsoft Windows versions with the exception of NT 4.0. The solution to the problem is to ping a station in the network before using the 'arp' command for the first time or use the PRINTSERVER-NetTool to enter the IP address.

1.2.2.4 PRINTSERVER-NetTool

You can easily enter the IP address and thus save it in the print server using the PRINTSERVER-NetTool.

Saving the IP address using the PRINTSERVER-NetTool in networks with routers is only possible if the router forwards multicast requests and the print servers are searched for via multicast. For more information, please read the section "Searching for Print Servers" on page 4-5 of the User Manual.

If the print server is connected and the printer is switched on, the print server is displayed in the print server list under 'ZeroConf' with an IP address from the address range 169.254.0.1 through 169.254.255.254, which is reserved for ZeroConf. The desired IP address can be entered via the shortcut menu.

For more information concerning the PRINTSERVER-NetTool , please read the "PRINTSERVER-NetTool" chapter on page 4-1 in the User Manual.

Proceed as follows:

1. Call the PRINTSERVER-NetTool.
2. Right-click the 'New Print Server' in the print server list.
3. Select 'IP Wizard...' from the shortcut menu.
4. Select 'Manual TCP/IP configuration'.
5. Follow the instructions of the installation routine.
   The IP address is saved in the print server.

1.2.3 Host Name

What Is a Host Name?

The host name is an alias for an IP address. We recommend that you always use a host name. If the IP address changes, only the file containing the assignment of the host name to the IP address must be changed. The host name used to address the print sever in your local network may be chosen freely. It is, however,

recommended to select a name associated with the respective board, such as IC0001FF, or with the printer.

Assigning the Host Name

The host name must be assigned to the IP address. This is carried out either in the 'hosts' file or on the DNS or WINS server. In this manual, only the assignment of the host name to the IP address using the 'hosts' file is described. For more information, please read the relevant section in the documentation of your operating system.

What Is the File 'hosts'?

The 'hosts' file is an internal system file in which the assignment of the host names to the IP addresses is saved.

Syntax: <IP address> <host name>
Example: 192.168.0.123 IC0001FF

The 'hosts' file is located in the 'windows' directory in Windows networks and in the 'etc' directory in UNIX networks. In other operating systems, such as AS/400 for example, the name of the assignment file may differ.

1.2.4 ARP Table

What Is the ARP Table?

The ARP table is an internal system file in which the assignment of IP addresses to hardware addresses is saved. This table is administered by the ARP protocol, whereby the entries expire after approximately 15 minutes and can therefore be forgotten. You can display and edit the ARP table using the 'arp' command.

The ARP table is needed for saving the IP addresses in a print server if no boot protocol is used (see section "The arp and ping Commands" on page 1-11).

1.2.5 TCP/IP Ports

What Are TCP/IP Ports?

During the transfer of files between two computers, addressing with the IP address alone is generally not sufficient. In addition to the IP address, a port number (TCP/IP port) is used. This number defines the computer memory area that is reserved for a specific communications connection. The combination of an IP address and a port number is unique for every communications connection and is defined as a socket.

LPD Protocol and TCP/IP Ports

If the LPD protocol is used for transferring print data, the corresponding data packet automatically contains a port number of '515' and does not need to be specifically configured. The transferred print data is saved to the memory area corresponding to the port number and then processed.

TCP/IP Port 4000

The print server can also be used for printing in a ThinPrint environment. The default printer port is TCP/IP Port 4000.

TCP/IP Ports Without LPD Protocol

If the LPD protocol is not available, as in the case of Windows 98 networks, you must configure the TCP/IP port yourself. To do this, you must install a printer port and enter the port number. In this case, such a port may also be called a direct printer port.

TCP/IP Ports and Logical Printers

The TCP/IP port corresponds to the logical printers (see section "Logical Printers" on page 1-4). The following TCP/IP ports are preset in your print server:

Port number	Preset function	Logical printer
9100	Default setting	1
9101	Changes Line Feed (LF) to Carriage Return with Line Feed (CR+LF)	2
9102	Converts all data from ASCII to PostScript	3

Port number	Preset function	Logical printer
9103	Prints a banner page in Novell networks or when the LPD protocol is used	4
9104	Prints all data in hex dump mode. Hex dump mode is mainly used to search for errors in print data. The data is printed as a byte in hexadecimal form instead of letters and numbers. Printer control commands are printed as hexadecimal values and do not influence the printout in any way.	5
9105	Not assigned	6
9106	Not assigned	7
2900	Supports the RSO Spooler (BS2000)	8

Logical Printers with Box Print Servers

With box print servers, logical printers are used to configure the port which will be addressed (LPT1, COM1 or USB1):

Port number	Option 1	Option 2	Logical printer
9100	LPT1	LPT1	1
9101	LPT2	USB1	2
9102	LPT3	USB2	3
9103	COM1	USB3	4
9104	LPT1	USB4	5
9105	LPT1	LPT1	6
9106	LPT1	LPT1	7
2900	LPT1	LPT1	8

Option 2 allows you to connect a hub to the USB port. In this case, four printers can be administered via USB 1 through 4 by means of the TCP/IP ports.

1.2.6 Gateway

Using a gateway, you can address IP addresses from external networks. Your print server is configured not to use gateways by default. If your network is not split into subnetworks, you do not need to take any further steps. If, however, you are using a gateway in your network, you should ask your system administrator for the IP address of the gateway. These parameters can be configured using either the print server homepage, the PRINTSERVER-NetTool, SNMP, or the FTP parameter transfer.

If the parameter 'Multicast router as gateway' has been enabled, the print server searches for a gateway independently. If the print server finds a gateway, the IP address of that gateway is entered automatically. If the gateway is not the right one, disable the parameter and enter the IP address of the right gateway manually. For more information, please read the section "Configuring TCP/IP" on page 4-20 of the User Manual.

1.2.7 Subnet Mask

What Is the Subnet Mask?

By means of the subnet mask, large networks can be split up into subnetworks. In this case, the user IDs of the IP addresses are assigned to the various subnetworks.

Example

If no subnetwork is used, the subnet mask of a class C network is set to '255.255.255.0'. If two subnetworks are used, the subnet mask may be set to '255.255.255.128', for example. Valid IP addresses in this example are '192.168.0.1' to '192.168.0.127' in the first subnetwork and '192.168.0.129' to '192.168.0.254' in the second subnetwork.

Subnet Mask Configuration

Your print server is configured not to use subnetworks by default. If your network is not split into subnetworks, you do not need to take any further steps. If, however, you are using a subnetwork, you should ask your system administrator for the subnet mask. These parameters can be configured using either the print server homepage, the PRINTSERVER-NetTool, SNMP, or the FTP parameter transfer.

1.3 DHCP

The print server supports DHCP, according to the RFC 1542, so that the print server's IP address can be assigned easily and conveniently via a DHCP server.

Dynamic name registration

In networks with DHCP servers, the dynamic name registration is done by DNS servers, which can be dynamically configured by the DHCP server. Most systems additionally use a WINS server, which answers name enquires that the DNS server cannot handle.

Requirements

Make sure that:

- ✓ The parameter 'DHCP' has been activated (see print server homepage).
- ✓ The parameter 'WINS registration' has been activated.
- ✓ The parameter 'WINS via DHCP' has been activated.

What Happens When the Print Server is Turned on?

Once the print server has been turned on, it asks for an IP address by means of a broadcast query. The DHCP server identifies the print server on the basis of its hardware address and sends a data packet to the print server. This data packet contains the print server's IP address, the default gateway and the IP address of the DNS server. The data packet is saved in the print server. The print server now transmits a name registration request to the WINS server, along with the IP address and host name assignment. The answer from the WINS server contains the period of validity of the name entry in the WINS database. Once this period has expired, the print server renews its registration with the WINS server so that its IP address and host name remain constantly valid.

What Happens When Printing?

During the installation of the print server, its host name is displayed on the monitor of the computer intended for printing. In order for you to be able to assign the host name to the IP address,

the computer asks the DNS server for the IP address of the print server. If the DNS server cannot answer this request, it forwards the request to the WINS server. Once the computer receives the answer, it sends the print data to the IP address of the print server.

You can also enter the IP address instead of the host name during the print server installation. In this case, you can send print data directly to the IP address.

If you wish to configure your print server on a DHCP server, please read the documentation for your operating system.

WINS Without DHCP

You can also set up the print server in a network only with WINS and without DHCP. In this case, the print server registers with the WINS server directly. In this process, you must configure the IP address of the WINS server manually in the print server. You must first disable the 'DHCP' and 'WINS via DHCP' parameters. These parameters can be configured using either the print server homepage, the PRINTSERVER-NetTool, SNMP, or the FTP parameter transfer.

1.4 Rendezvous / ZeroConf

What Is Rendezvous?

Rendezvous allows the automatic configuration of computers, software services and peripheral devices in TCP/IP-based networks. Rendezvous is meant for smaller networks (max. 1000 clients) which are to be set up quickly and where the use of a DHCP server is not profitable. Rendezvous was initially developed by Apple and is an inherent part of the Mac OS X operating system.

Rendezvous mainly consists of three aspects:

- Advertising of services
- Discovery of services
- Resolution of service names to IP addresses and TCP/IP ports

Automatic IP address via ZeroConf

Via ZeroConf, a print server that is connected to the network automatically obtains an IP address. This IP address is taken from the address range 169.254.0.1 to 169.254.255.254 which is reserved for ZeroConf.

Services

The domain name service is used for additional Rendezvous features in Apple networks. Since there is no central DNS server in Rendezvous networks, each device and application has its own small DNS server. This integrated DNS server (mDNS) collects and administers the information of all participants in the net. In addition to the features of a classical DNS server, the mDNS server also saves the IP address, the service name and the offered services of each participant.

What Happens When the Print Server is Turned on?

Once the print server is connected to the network and switched on, the print server checks whether an IP address can be obtained from a DHCP server or boot protocols. If this is not the case, the print server assigns itself an IP address via ZeroConf. For this purpose,

the print server picks an IP address at random from the address range reserved for ZeroConf and sends a query to the network. If this IP address has already been assigned elsewhere in the network, the print server will receive a message. The print server then sends another query with a different IP address. If the IP address is available, it is saved in the print server.

What Happens next in Apple Networks?

The print server repeats the same procedure for the service name. The service name consists of the default print server name and the name of the connected printer. After that, the print server starts its printing and HTTP service and advertises both services in the network. Now the print server is visible in the network and printing can begin.

Integration of the printer server in other networks

In many cases, the print server is to be integrated into the actual network after the automatic configuration in the 169.254.x.x segment. In Apple networks you can use a browser to call the print server homepage via Rendezvous and configure the print server accordingly. In other networks you can do this using the PRINTSERVER-NetTool. In the print server list of the PRINTSERVER-NetTool the print server is displayed with its ZeroConf IP address. For more information, please read the "PRINTSERVER-NetTool" chapter on page 4-1 of the User Manual.

You can also print a status page, check the print server's IP address and then call the print server homepage. For more information, please read the section "Printing the Status Page Using the Status Button" on page 2-31 and the "Print Server Homepage" chapter on page 3-1 of the User Manual.

1.5 SNMP

The SNMP protocol is used for providing and transferring management information within the network. The SNMP architecture is based on one or more management stations and several network elements with one or more implemented network management agents. The SNMP protocol is used for communication between the management stations and the agents. The management information is saved in so-called management information bases (MIB).

Private MIB of the Print Server

As an agent, the print server provides the standard 'MIB-II' and a 'private MIB'. All print server parameters and status information are saved in the 'private MIB'. For more information, please read the section "Parameter Description" on page B-2 of the User Manual. The 'private MIB' is saved in the print server on delivery and can be installed immediately. On the CD-ROM, you will find a formal description of the 'private MIB' objects. If there is no CD-ROM included in the delivery, please consult your retailer or printer manufacturer.

Basic Functions

The system administrator can query and configure the print server parameters from a management tool, such as OpenView or TransView, by means of the SNMP protocol. In case of an error, such as 'Paper empty', the print server automatically sends an error message, the so-called trap, to pre-defined IP or IPX addresses. To this end, the IP and IPX addresses must be configured and the traps must be activated using the print server homepage, the PRINTSERVER-NetTool, or FTP parameter transfer.

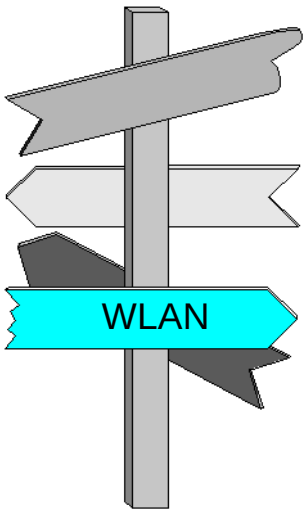
When using SNMP, make sure that:

- ✓ The TCP/IP protocol or the IPX protocol is installed on any computer intended for printing.

- ✓ The print server is connected and the printer is turned on.
- ✓ The IP address is saved in the print server.

CHAPTER 2

Installation in WLAN Networks



This chapter contains information concerning the following topics:

- Basic Principles
- Installation for Use in the Ad-Hoc Mode
- Installation for Use with Unencrypted Access Points
- Installation for Use with Protected Access Points
- Troubleshooting

2.1 Basic Principles

A WLAN print server can be operated in three different modes:

- Ad-Hoc mode (default setting)
- Infrastructure mode
- Auto mode

Ad-Hoc mode

In the Ad-Hoc mode, the print server communicates directly with another WLAN client (peer-to-peer). The Ad-hoc mode is set by default on the print server via a jumper/switch.

Infrastructure mode

The infrastructure mode is suitable for setting up large wireless networks with several devices in different rooms. Communication between the devices is done via an access point which is connected to the network. The access point can be encrypted or unencrypted. The infrastructure mode can be set via a jumper/switch on the print server.

Auto mode

In the auto mode, the print server searches for an access point which is connected to the network and which has the strongest radio signal. The print server then tries to log into this access point. If the access point is encrypted and the print server cannot log in, the print server will search for an access point with a weaker radio signal. If the print server finds an unencrypted access point, it logs into this access point. If the print server does not find any access point, it switches to the Ad-Hoc mode. The auto mode can be set via a jumper/switch on the print server.

The IC155-WLANPOCKET is an exception. After the IC155-WLANPOCKET is switched on, it searches for an access point in the auto mode. If the print server finds an encrypted access point, it does not search any further.

Procedure

Select one of the following options:

- Installation for Use in the Ad-Hoc Mode
- Installation for Use with Unencrypted Access Points
- Installation for Use with Protected Access Points

2.2 Installation for Use in the Ad-Hoc Mode

Requirements

Make sure that:

- ✓ The PRINTSERVER-NetTool has been installed.
  For more information, please read the section "Installing the PRINTSERVER-NetTool" on page 4-3 of the User Manual.
- ✓ The PC/Mac is in the Ad-Hoc mode.
- ✓ The PC/Mac has the SSID 'wlsetup'.

Proceed as follows:

1. Start the PRINTSERVER-NetTool.
   For more information, please read the section "Starting the PRINTSERVER-NetTool" on page 4-4 of the User Manual.
2. Select the desired print server from the print server list.
3. Select the WLAN Wizard from the shortcut menu of the print server.
4. Follow the instructions of the Wizard.
   Enter 'wlsetup' or an arbitrary name as SSID.
5. Click 'Finish'.
6. If you have entered an arbitrary SSID into the WLAN Wizard, re-enter this SSID on your PC/Mac.
7. Install the print server on the PC/Mac.
   In order to do this, read the respective section for your operating system in the Installation Manual.

2.3 Installation for Use with Unencrypted Access Points

Requirements

Make sure that:

- ✓ The PRINTSERVER-NetTool has been installed.
  For more information, please read the section "Installing the PRINTSERVER-NetTool" on page 4-3 of the User Manual.
- ✓ The PC/Mac is in the infrastructure mode.
- ✓ The print server is set to the infrastruture mode via the switch/jumper.

Proceed as follows:

1. Start the PRINTSERVER-NetTool.
   For more information, please read the section "Starting the PRINTSERVER-NetTool" on page 4-4 of the User Manual.
2. Select the desired print server from the print server list.
3. Select the WLAN Wizard from the shortcut menu of the print server.
4. Follow the instructions of the Wizard.
   If the print server is to be operated on a specific access point, enter the SSID of the access point. If the print server is to be operated on an arbitrary access point, do not enter an SSID.
5. Click 'Finish'.
6. Install the print server on the PC/Mac.
   In order to do this, read the respective section for your operating system in the Installation Manual.

2.4 Installation for Use with Protected Access Points

The print server cannot automatically recognize the access point in the network, if:

- the access point is encrypted
- an authentication is used
- the access point does not disclose its SSID

In these cases, the print server has to be prepared for communication with the access point.

As for encrypted access points, the same WEP key must be used for the access point and the print server. Some access points convert WEP keys that are entered as ASCII text into arbitrary hexadecimal values. In this case, the WEP keys for the access point and the print server do not match. It is therefore recommended to use hexadecimal WEP keys.

Requirements

Make sure that:

✓ The PRINTSERVER-NetTool has been installed.
For more information, please read the section "Installing the PRINTSERVER-NetTool" on page 4-3 of the User Manual.

Proceed as follows:

1. Write down the WEP keys of the access point.
2. Temporarily switch your PC/Mac to the Ad-hoc mode.
3. Temporarily change your PC/Mac to the SSID 'wlsetup'.

4. Start the PRINTSERVER-NetTool.
   For more information, please read the section "Starting the PRINTSERVER-NetTool" on page 4-4 of the User Manual.
5. Select the WLAN Wizard from the shortcut menu of the print server.
6. Follow the instructions of the Wizard.
   Enter the SSID of the access point.
7. Click 'Finish'.
8. Switch the print server to the infrastruture mode using the switch/jumper.
9. Switch your PC/Mac to the infrastructure mode.
10. Restore the default WLAN settings on the PC/Mac.
11. Install the print server on the PC/Mac.
    In order to do this, read the respective section for your operating system in the Installation Manual.

2.5 Troubleshooting

2.5.1 Interpreting the Status Page

In order to find out the print server's connection status in the network, it is required to interpret the status page of the print server.

Proceed as follows:

1. Press the status button of the print server.
   The status page is printed.

WLAN Parameter

Under 'WLAN' you can obtain information about the following parameters:

Parameter	Information
Mode	Mode which is set via the switch/jumper on the print server
Connection status	Determined WLAN status of the print server in the network
Network name	SSID: - not configured in the infrastructure mode - in the Ad-Hoc mode 'wlsetup' (factory default setting)
Current network name	SSID used
Channel	Radio channel
Encryption	Print server encryption
Speed	Transfer rate

Examples

The following section gives some examples which will help you to interpret the entries on the status page:

Example 1

Mode: Auto
Connection status: Ad-Hoc

Network name: wlsetup
Encryption: off
The print server is set to the auto mode via the switch/jumper. Since the print server did not find any unencrypted access point, it switches to the Ad-Hoc mode.

Example 2

Mode: Auto
Connection status: Infrastructure
Network name: SSID of an access point (example: Tsunami)
Encryption: off
The print server is set to the auto mode via the switch/jumper. The print server has found an unencrypted access point and therefore switches to the infrastructure mode

Example 3

Mode: Infrastructure
Connection status: Infrastructure
Network name: SSID of an access point (example: Tsunami)
Encryption: on
The print server is set to the infrastruture mode via the switch/jumper. The print server communicates with an encrypted access point named 'Tsunami'.

2.5.2 Resetting Parameters

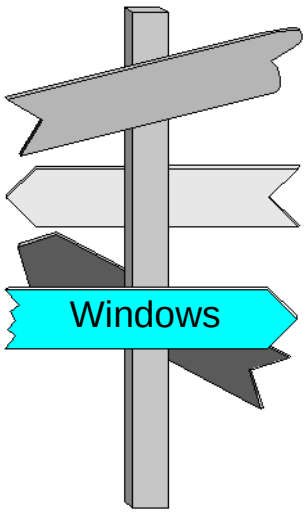
If the print server is not displayed in the print server list after the installation of the PRINTSERVER-NetTool, the print server parameters must be reset because you might have made a typing error while entering the SSID or the WEP key.

For more information, please read the section "Resetting the Parameters using the Status Button" on page 2-34 of the User Manual.

After the print server parameters have been reset, the WLAN print server must be reinstalled.

CHAPTER 3

Installation in Windows Networks



This chapter contains information concerning the following topics:

- Basic Principles
- Installation in Windows Networks using the Printer Wizard
- Installing in Windows Networks using the PRINTSERVER Print Monitor (Encrypted Printing)

3.1 Basic Principles

Print Server Function

In a network, the print server acts as network connection for a printer which is independent of the computer. The print data is transferred from the individual computer to the network using the PRINTSERVER Print Monitor. The print server receives the print data and routes it to the printer.

What is the PRINTSERVER Print Monitor?

The PRINTSERVER Print Monitor constitutes the connecting piece between the computer and the print server. It ensures the transfer of print data from the computer to the print server by means of direct TCP/IP ports. The PRINTSERVER Print Monitor must be installed on every computer intended for printing. It is not possible to share the printer.

Printer Wizard

The Printer Wizard is available for installing the print server.

The Printer Wizard is available in two versions:

- printerwizardxp.exe for Windows XP, Windows 2000, and Windows NT4.0
- printerwizard9x.exe for Windows 98, Windows 95, and Windows Me

Socket printing

With the assistance of the wizard, the print server is set up for printing via TCP/IP ports (socket printing). In the process, the PRINTSERVER Print Monitor and, under Windows XP and Windows 2000, the required printer driver are automatically installed.

Before installing the print server in Windows 98, Windows 95, Windows Me, and Windows NT4.0, you must install the required printer driver manually.

3.2 Installation in Windows Networks using the Printer Wizard

In this section, the installation of your PRINTSERVER with the aid of the Printer Wizard is described.

Starting the Wizard

The wizard can either be started directly from the CD-ROM or can be copied to a computer from where it can be started.

Before beginning the actual installation, you should have basic knowledge of TCP/IP. For more information, please read the section "Basic TCP/IP Terminology" on page 1-7.

Requirements

Before installation, make sure that:

- ✓ The print server is connected and the printer is turned on.
- ✓ The TCP/IP protocol is installed on every computer intended for printing.
- ✓ The printer driver is installed for Windows 98, Windows 95, Windows Me, and Windows NT4.0.

Proceed as follows:

1. Start the Printer Wizard:
   for Windows XP/2000/NT4.0 printerwizardxp.exe
   for Windows 98/95/Me printerwizard9x.exe
2. Follow the instructions of the wizard.
   After the completion of the wizard, the print server and the printer are installed.

Depending on the printer type, box and pocket print servers that are connected to the printer's Centronics interface may have printing problems. In this case, disable the 'bidirectionality' of the

Windows driver under 'Properties'. This applies to the MINOLTA QMS PagePro 1200W printer, for example.

3.3 Installing in Windows Networks using the PRINTSERVER Print Monitor (Encrypted Printing)

In this section, the installation of your PRINTSERVER in Windows networks is described if printing is done via an encrypted HTTP port.

The use of an http port comprises the following benefits:

- encryption of print data (optional)
- using a proxy server, print jobs can be sent to a print server via the Internet

Procedure

The installation involves the following steps:

- Installing the PRINTSERVER Print Monitor
- Setting up the PRINTSERVER Print Monitor

3.3.1 Installing the PRINTSERVER Print Monitor

The PRINTSERVER Print Monitor can be found on the CD-ROM enclosed in the product packaging of your print server. If there is no CD-ROM included in the delivery, please consult your retailer or printer manufacturer.

Proceed as follows:

1. Insert theCD-ROM into your CD-ROM drive.
   The CD-ROM will start automatically.
2. Install the PRINTSERVER Print Monitor.

3.3.2 Setting up the PRINTSERVER Print Monitor

The PRINTSERVER Print Monitor is set up by adding and configuring an HTTP port.

The following description refers to Windows XP. The handling and outer appearance may slightly differ in other Windows networks.

Proceed as follows:

1. Select 'Properties' from the printer shortcut menu.
2. Select the 'Ports' tab.
3. Click 'Add...'.
   The following window appears:

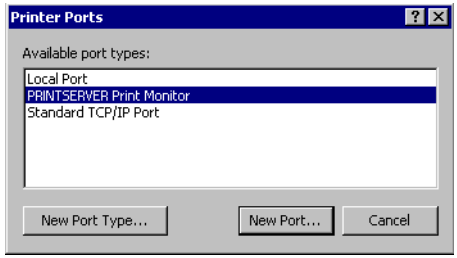


Fig. 3-1: 'Printer Ports' window

4. Select 'PRINTSERVER Print Monitor'.
5. Click 'New Port...'.
   The following window appears:

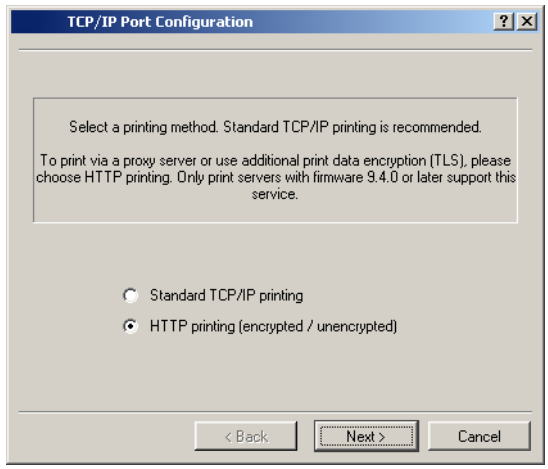

TCP/IP Port Configuration
Select a printing method. Standard TCP/IP printing is recommended.
To print via a proxy server or use additional print data encryption (TLS), please choose HTTP printing. Only print servers with firmware 9.4.0 or later support this service.
Standard TCP/IP printing
HTTP printing (encrypted / unencrypted)
< Back
Next >
Cancel

Fig. 3-2: 'HTTP printing' window

6. Activate 'HTTP printing'.
7. Confirm by clicking 'Next'.
   The following window appears:

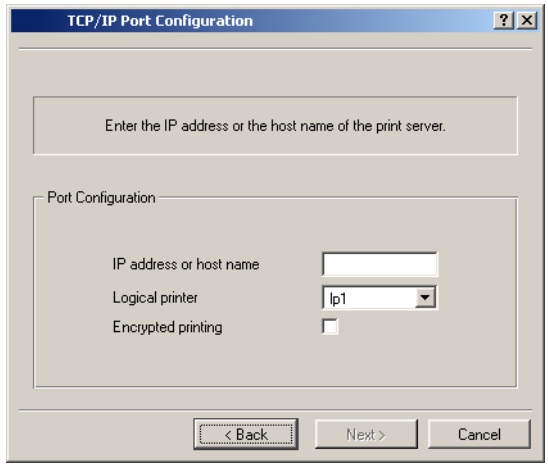


Fig. 3-3: 'HTTP Port Configuration' window

8. Enter the IP address or the host name of the print server.
9. Select the desired logical printer from the list. The default setting is logical printer lp1. With box print servers, the port is addressed via the logical printer. For more information, please read the section "TCP/IP Ports" on page 1-15.

Data encryption

10. Select 'Encrypted printing' if you wish to encrypt print data.

    Data encryption reduces the data transfer rate of you print server. So maybe you would like to set up a second port without data encryption.

11. Confirm by clicking Next.
    The following window appears:

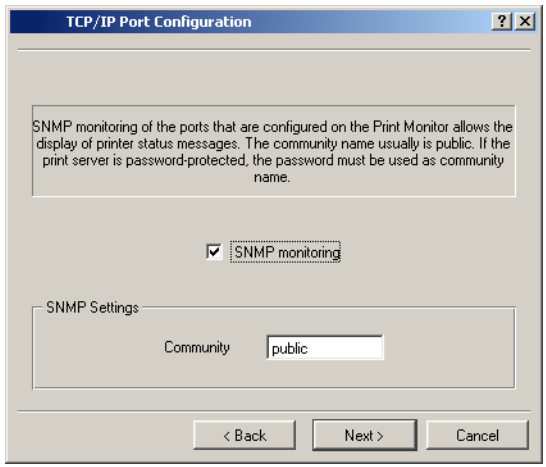

TCP/IP Port Configuration
SNMP monitoring of the ports that are configured on the Print Monitor allows the display of printer status messages. The community name usually is public. If the print server is password-protected, the password must be used as community name.
SNMP monitoring
SNMP Settings
Community
public
< Back
Next >
Cancel

Fig. 3-4: Configuring SNMP monitoring

If the print server is protected by a password and the 'Access control' parameter is enabled, you must enter this password under 'Community'.

12. Confirm by clicking 'Next'.
    The following window appears:

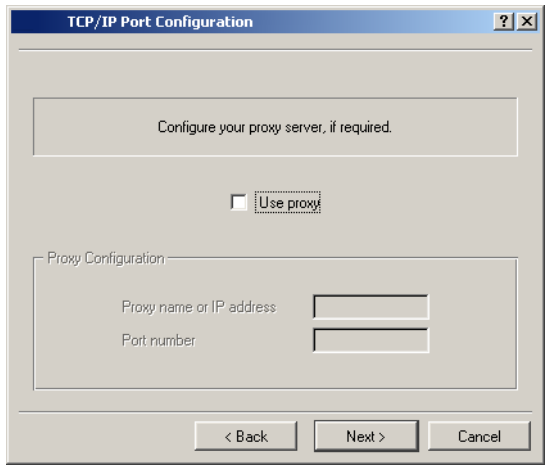
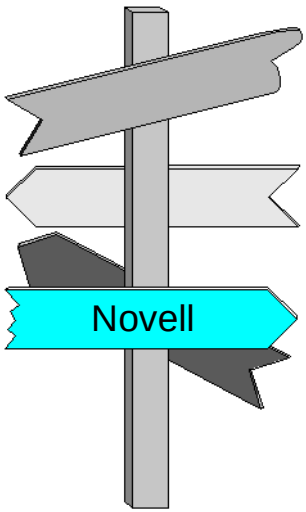


Fig. 3-5: Configuring the proxy server

13. Enable 'Use proxy', if you want to print using a proxy server.
14. Enter the IP address or the name of the proxy server, if necessary.
15. Enter the port number of the proxy server, if necessary.
16. Confirm by clicking 'Next'.
17. Check your settings.
18. Click 'Finish'.

CHAPTER 4

Installation in Novell Networks



This chapter contains information concerning the following topics:

- Basic Principles
- Installing in NetWare 6/5/4 Networks in Print Server Mode
- Installing in NetWare 6/5 Networks in Print Server Mode (Pure IP)
- Installing in NetWare 6/5/4 Networks in Remote Printer Mode
- Installing in NetWare 6/5 Networks with NDPS Gateways
- Tips and Tricks

4.1 Basic Principles

What Happens When Printing in Novell Networks?

The printing sequence in Novell networks has three steps:

- Print data rerouting
- Intermediate print data storage in a print queue
- Printout

Print data that is transferred from an application to a printer interface, such as LPT1, is rerouted to the NetWare file server. The incoming print job is added to a print queue on the file server. The print job is then routed either to a print server connected to the printer or to a remote printer, where it is then printed out.

Which Protocols are Used?

The IPX protocol is used as a network protocol in all Novell networks. The IPX protocol must be installed on every workstation which is to provide printing services. If remote printing is selected, the SPX protocol is then used as the network protocol between the file server and the PRINTSERVER.

Print Server, Network Printer, or Remote Printer?

Your print server can be installed in Novell networks in various modes. Print server mode is available in all Novell NetWare networks. In Novell NetWare 6/5/4 networks, the print server can also be installed as network printer (NPRINTER). In Novell NetWare 6/5 networks, print data can also be sent via NDPS gateways. Each mode has certain advantages and disadvantages that will be described below.

Print Server Mode

In the print server mode, the PRINTSERVER carries out an automatic recognition of the network structure. After activation, the PRINTSERVER transfers broadcast data packets having the IEEE_802.2, IEEE_802.3, ETHERNET_II and SNAP Novell frame types to the net. This gives the print server a general overview of the existing bindery and NDS servers as well as the

installed print queues. The print server logs itself on and automatically recognizes changes in the network structure by searching the network for new servers every two minutes. This time period for the new recognition of the network structure, the so-called refresh time, and the used Novell protocol headers can be configured using either the print server homepage, the PRINTSERVER-NetTool, or parameter transfer via FTP.

In the print server mode, the PRINTSERVER queries at regular intervals whether any file servers have print jobs in their respective print queues. If any print job exists, the PRINTSERVER collects the print data and sends it to the printer for processing. This time period of polling the print queue, the so-called poll time, can be configured using either the print server homepage or the PRINTSERVER-NetTool.

Every print server in the print server mode requires a Novell NetWare user license. The data throughput during print server mode is comparatively high. The PRINTSERVER can service 16 bindery servers and 8 NDS servers (24 NDS servers when bindery is turned off). You can install and assign up to a total of 16 print queues to a print server.

Remote printer mode

In remote printer mode, a Novell print server must be started on the Novell file server. This Novell print server is the module PSERVER.NLM.

In the remote printer mode the print jobs are routed from the PSERVER to the PRINTSERVER. The PRINTSERVER adopts the function of the NPRINTER in NetWare 6/5/4 networks. The print server routes status information, such as 'Ready to Print' or 'Paper empty' to the PSERVER. If the PSERVER receives print jobs from the computer, these jobs are routed to the PRINTSERVER.

In remote printer mode, the print server does not need a Novell NetWare user license. The PRINTSERVER requires comparatively fewer resources in the remote printer mode and does not overload the network. PSERVER can administer a maximum of 256 print servers in Novell NetWare 4 networks while in remote printer mode.

NDPS Gateways

The NDPS Gateway functions as an interface between the print server and the Novell client and administers the printer agent. The advantages of using NDPS Gateways are the automatic installation of drivers and the improved monitoring of the various printer states.

For more information, please read the documentation issued by Novell regarding the NDPS.

What is the Novell Name?

The Novell name can be used instead of the default print server name. You can use the Novell name whenever a print server needs a meaningful name, such as ICxxxxxx. The Novell name can be assigned using either the print server homepage, the PRINTSERVER-NetTool or the FTP parameter transfer.

Procedure

Which procedures can be selected?

- Installing in NetWare 6/5/4 Networks in Print Server Mode
- Installing in NetWare 6/5 Networks in Print Server Mode (Pure IP)
- Installing in NetWare 6/5/4 Networks in Remote Printer Mode
- Installing in NetWare 6/5 Networks with NDPS Gateways

4.2 Installing in NetWare 6/5/4 Networks in Print Server Mode

In this section, the installation of your PRINTSERVER in Novell NetWare 6/5/4 networks for the NDS printout in print server mode is described. A wizard guides you through an easy and safe installation in the PRINTSERVER-NetTool. In a single step, you can install a print server, a printer, and a print queue.

Before beginning the actual installation, you should have basic knowledge of Novell networks. For more information, please read the section "Basic Principles" on page 4-2.

Before installation, make sure that:

- ✓ The print server is connected and the printer is turned on.
- ✓ The IPX protocol is installed on every computer intended for printing.
- ✓ A Novell NetWare client is installed on the computer.

Procedure

The installation involves the following steps:

- Setting up a Print Server, Printer, and Print Queue
- Setting Up the Printer on the Computer

4.2.1 Setting up a Print Server, Printer, and Print Queue

Proceed as follows:

1. Start the PRINTSERVER-NetTool.

2. Click the print server in the print server list.
3. Select 'NetWare Wizard' from the 'Installation' menu. The following window appears:

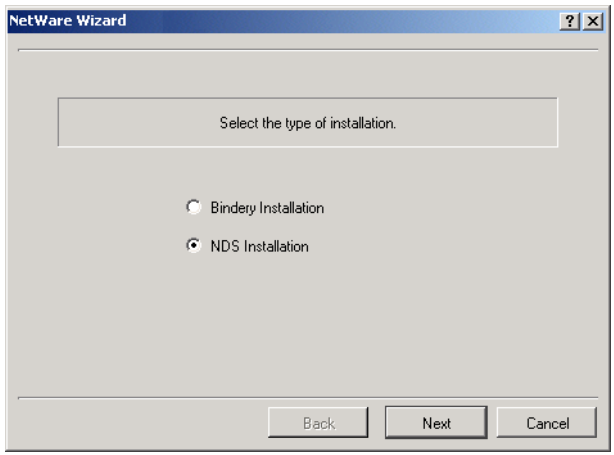


Fig. 4-1: NetWare Wizard

4. Select 'NDS Installation'.
5. Follow the instructions of the installation routine.

4.2.2 Setting Up the Printer on the Computer

Now the printer has to be set up on each computer or workstation that is to be used for printing. The following section describes the setup of the printer in Windows 98.

If desired, please see the Windows Manual for instructions on how to set up printers.

Proceed as follows:

1. Begin the printer installation.
   The following window will appear during the installation routine:

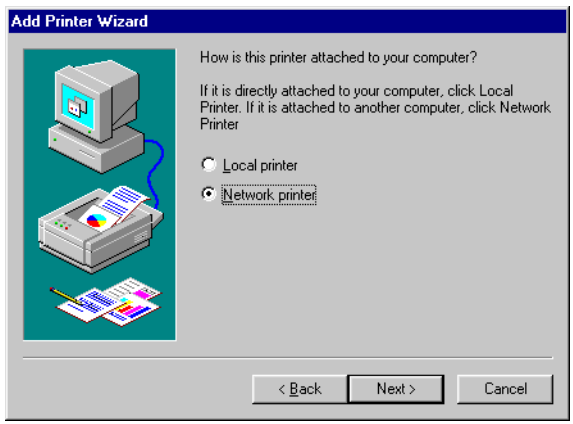

Add Printer Wizard
How is this printer attached to your computer?
If it is directly attached to your computer, click Local Printer. If it is attached to another computer, click Network Printer
Local printer
Network printer
< Back
Next >
Cancel

Fig. 4-2: Select Network printer

2. Select Network printer.
3. Click 'Next >'.
   The following window appears:

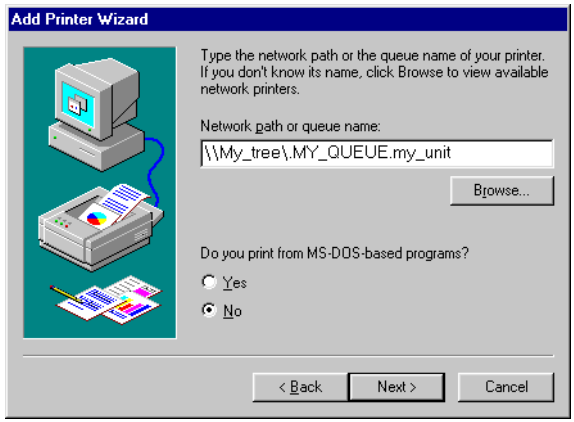

Add Printer Wizard
Type the network path or the queue name of your printer. If you don't know its name, click Browse to view available network printers.
Network path or queue name:
\\My_tree\.MY_QUEUE.my_unit
Browse...
Do you print from MS-DOS-based programs?
Yes
No
< Back
Next >
Cancel

Fig. 4-3: Select print queue

4. Select the respective print queue.
5. Follow the instructions of the installation routine.

4.3 Installing in NetWare 6/5 Networks in Print Server Mode (Pure IP)

In this section, the installation of your PRINTSERVER in IP-based (Pure IP) Novell NetWare 6/5 networks for the NDS printout in print server mode is described. Quick Setup in the NetWare Administrator enables easy, safe installation. In a single step, you can install a print server, a printer, and a print queue.

Before beginning the actual installation, you should have basic knowledge of Novell networks. For more information, please read the section "Basic Principles" on page 4-2.

Entries

The installation sequence requires the following entries:

NetWare Administrator	User input	Example in the text
Print Server Name	<name of the PRINTSERVER> or Novell name	IC0001FF
Printer Name	<Printer Name> + #1 to #8 for the logical printer	MY_PRINTER#1
Print Queue Name	<arbitrary name>	MY_QUEUE

Before installation, make sure that:

- ✓ The print server is connected and the printer is turned on.
- ✓ IP has been set up on the Novell server.
- ✓ A Novell NetWare client with IP support is installed on every computer intended for printing.
- ✓ The IP address is saved in the print server.
- ✓ The parameter 'Pure IP' has been activated.

Procedure

The installation involves the following steps:

- Setting up a Print Server, Printer, and Print Queue
- Setting Up the Printer on the Computer

4.3.1 Setting up a Print Server, Printer and Print Queue

Proceed as follows:

1. Start the NetWare Administrator.
   The following window appears:

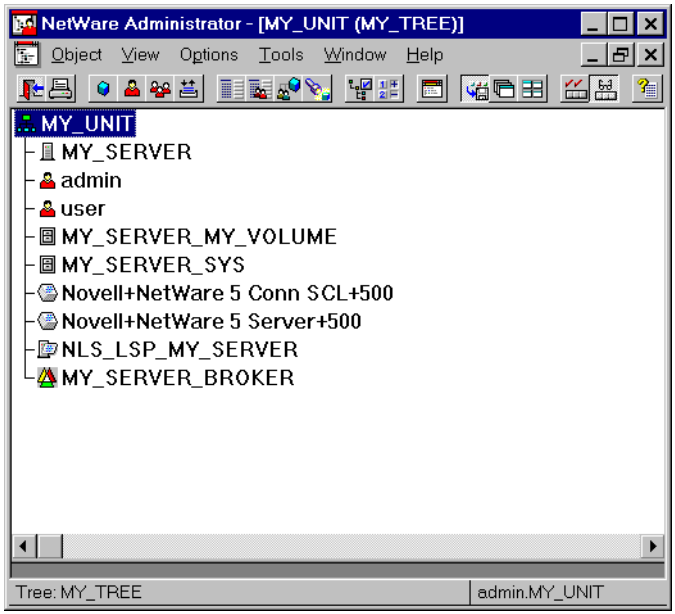


Fig. 4-4: NetWare Administrator

2. Mark the context.

3. Select the 'Print Services Quick Setup (Non-NDPS)' menu item in the 'Tools' menu.
   The following window appears:

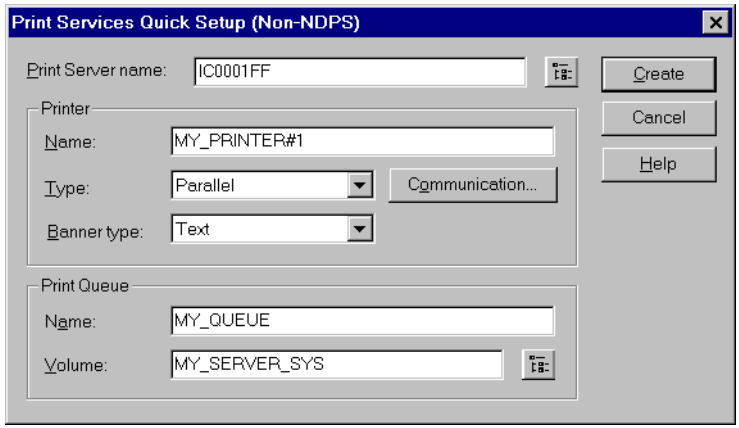


Fig. 4-5: 'Print Services Quick Setup (Non-NDPS)' window

4. Enter the print server name in the 'Print Server name' box.
   Syntax: ICxxxxxx
   Example: IC0001FF
   Here you may also use the Novell name of the print server if you assign this name using the print server homepage, the PRINTSERVER-NetTool, or FTP parameter transfer.
5. Enter an arbitrary name and a logical printer in the 'Printer Name' box.
   Syntax: <Printer Name>#1 - #8
   Example: MY_PRINTER#1
   The logical printers are defined using extensions #1 - #8. With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4). If no logical printer is defined, all print data is automatically routed to logical printer #1.
6. Enter an arbitrary name in the 'Print Queue Name' box.
   Example: MY_QUEUE

7. If necessary, select the correct volume.
8. Click 'Create'.
   The tree looks as follows:

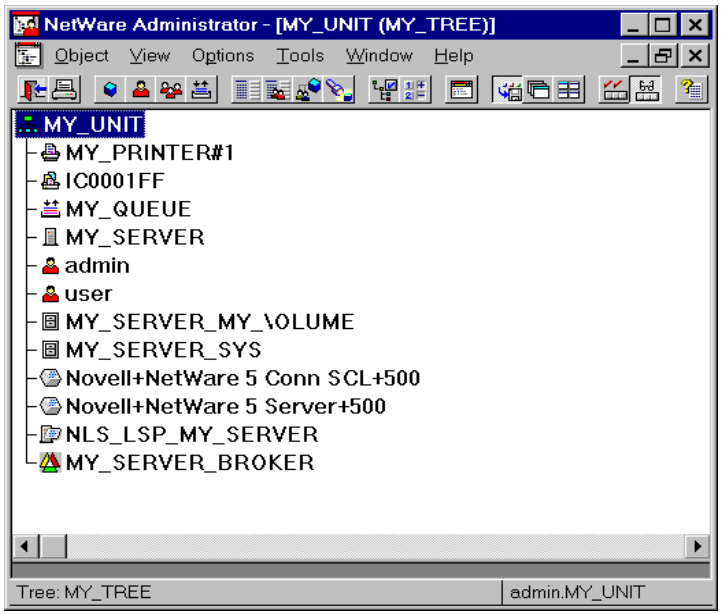


Fig. 4-6: Installed print server in print server mode

4.3.2 Setting Up the Printer on the Computer

Now the printer has to be set up on each computer or workstation that is to be used for printing. The following section describes the setup of the printer in Windows 98.

If desired, please see the Windows Manual for instructions on how to set up printers.

Proceed as follows:

1. Begin the printer installation.
   The following window will appear during the installation routine:

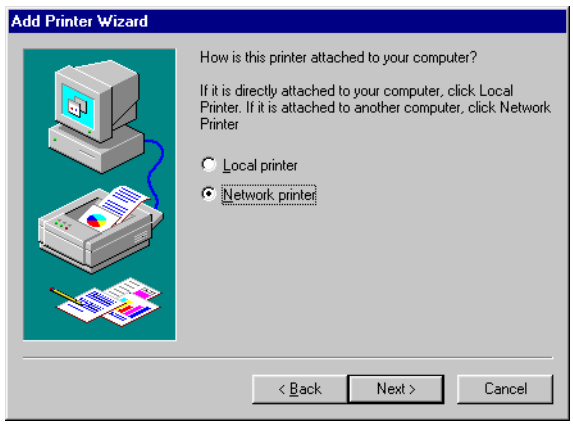

Add Printer Wizard
How is this printer attached to your computer?
If it is directly attached to your computer, click Local Printer. If it is attached to another computer, click Network Printer
Local printer
Network printer
< Back
Next >
Cancel

Fig. 4-7: Select Network printer

2. Select Network printer.
3. Click 'Next >'.
   The following window appears:

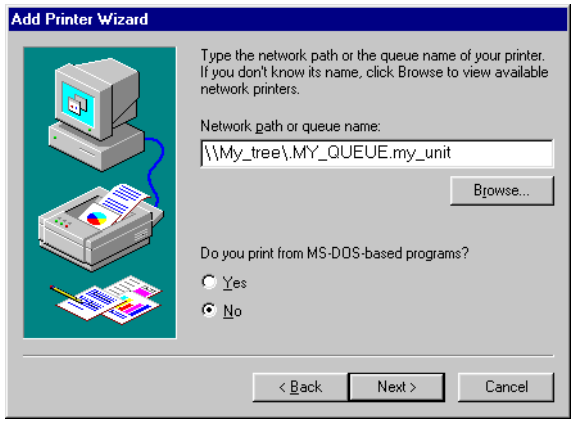

Add Printer Wizard
Type the network path or the queue name of your printer. If you don't know its name, click Browse to view available network printers.
Network path or queue name:
\\My_tree\.MY_QUEUE.my_unit
Browse...
Do you print from MS-DOS-based programs?
Yes
No
< Back
Next >
Cancel

Fig. 4-8: Select print queue

4. Select the respective print queue.
5. Follow the instructions of the installation routine.

4.4 Installing in NetWare 6/5/4 Networks in Remote Printer Mode

In this section, the installation of your PRINTSERVER in Novell NetWare 6/5/4 networks for the NDS printout in print server mode is described.

Before beginning the actual installation, you should have basic knowledge of Novell networks. For more information, please read the section "Basic Principles" on page 4-2.

Entries

The installation sequence requires the following entries:

NetWare Administrator	User input	Example in the text
Print Server Name	<name of PSERVER.NLM> on the file server	MY_PRINT_SERVER
Printer Name	<name of the PRINTSERVER> or Novell name	IC0001FF
Print Queue Name	<arbitrary name>	MY_QUEUE

For more information, please read the section "Print Server Name" on page 1-3 and the section "Logical Printers" on page 1-4.

Before installation, make sure that:

- ✓ The print server is connected and the printer is turned on.
- ✓ The IPX protocol is installed on every computer intended for printing.
- ✓ A Novell NetWare client is installed on the computer.

Procedure

The installation involves the following steps:

- Installing a print server, a printer, and a print queue
- Configuring the PRINTSERVER
- Starting PSERVER on the File Server
- Setting Up the Printer on the Computer

4.4.1 Installing a print server, a printer, and a print queue

Quick Setup in the NetWare Administrator enables easy, safe installation. In a single step, you can install a print server, a printer, and a print queue.

Proceed as follows:

1. Start the NetWare Administrator.
   The following window appears:

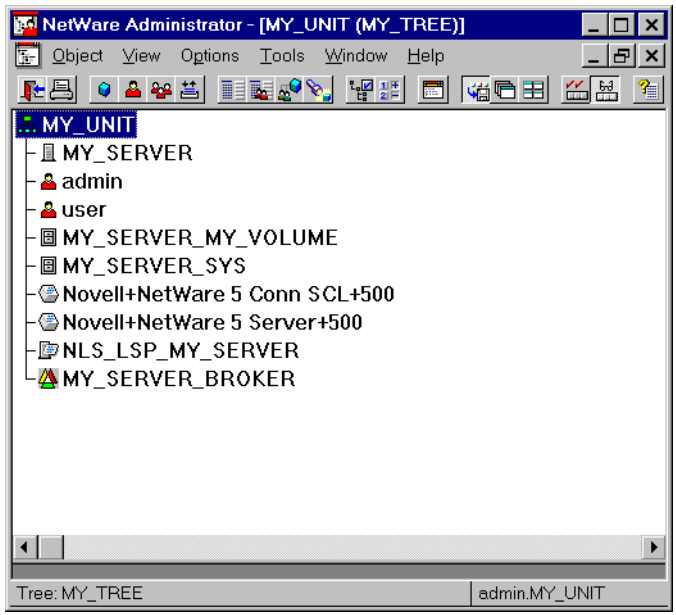


Fig. 4-9: NetWare Administrator

2. Mark the context.
3. Select the 'Print Services Quick Setup (Non-NDPS)' menu item in the 'Tools' menu.
   The following window appears:

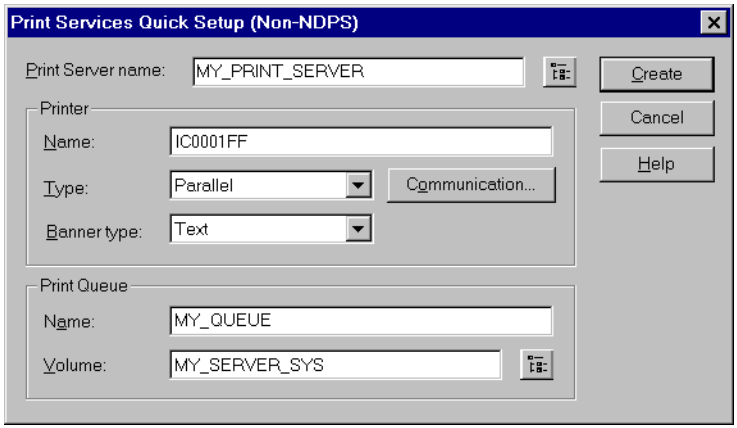


Fig. 4-10: 'Print Services Quick Setup (Non-NDPS)' window

4. Enter an arbitrary name for the print server in the 'Print Server name' box.
   MY_PRINT_SERVER
5. Enter the name of the print server in the 'Printer Name' box.
   Syntax: ICxxxxxx
   Example: IC0001FF
6. Enter an arbitrary name in the 'Print Queue Name' box.
   MY_QUEUE
7. If necessary, select the correct volume.
8. Click 'Create'.
   The tree looks as follows:

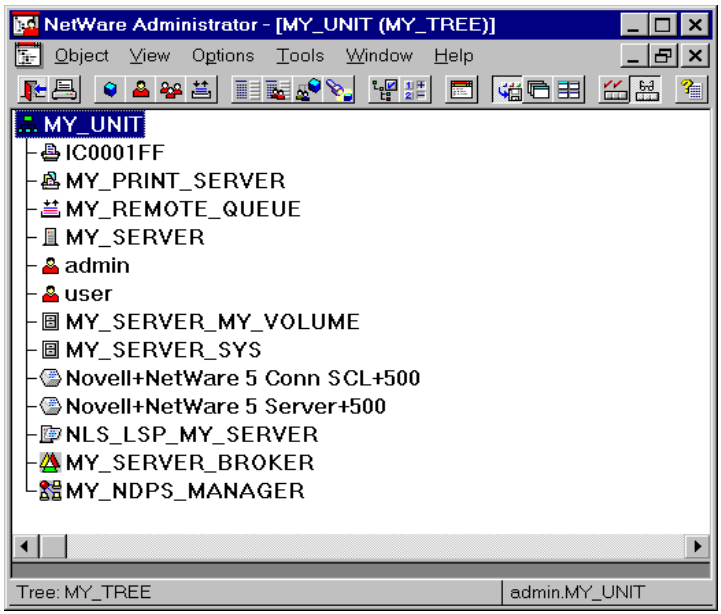


Fig. 4-11: Installed Print Server in Remote Printer Mode

4.4.2 Configuring the PRINTSERVER

The name of the print server must be configured on the PRINTSERVER, so that status messages can be transferred from the print server to the file server. You can do this using either the print server homepage, the PRINTSERVER-NetTool, or the FTP parameter transfer. In this section, the configuration using the PRINTSERVER-NetTool is described. If you wish to use the print server homepage, please read section "Configuring Novell NetWare" on page 3-16 in the User Manual. If you wish to use the FTP parameter transfer function, please read section "Configuring Parameters via FTP" on page B-14 in the User Manual.

Proceed as follows:

1. Start the PRINTSERVER-NetTool.
2. Double-click the print server in the print server list.
3. Select 'NetWare' from the left frame.
4. Select the 'Remote printer mode' tab.
   The following window appears:

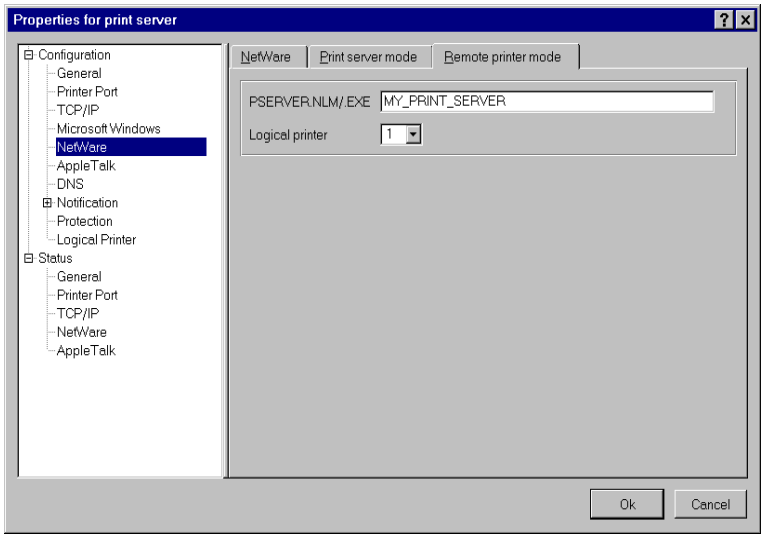


Fig. 4-12: Enter PSERVER Name

5. Enter the name of the print server in the 'PSERVER.NLM/.EXE' box.
   Example: MY_PRINT_SERVER
6. Select a logical printer from the 'Logical printer' box, if necessary. With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4). If no logical printer is defined, all print data is automatically routed to logical printer #1.
7. Click 'OK' to confirm.

4.4.3 Starting PSERVER on the File Server

During the last step, the Novell print server must be set up on the file server in the PSERVER module in order to transfer the print data from PSERVER to the PRINTSERVER. This requires the starting up of the module PSERVER with the name of the PSERVER entered in the PRINTSERVER-NetTool.

Proceed as follows:

1. Start the PSERVER on the file server with the PSERVER name which you entered in the PRINTSERVER-NetTool.
   Syntax: LOAD PSERVER <PSERVER name>
   Example: LOAD PSERVER MY_PRINT_SERVER

4.4.4 Setting Up the Printer on the Computer

Now the printer has to be set up on each computer or workstation that is to be used for printing. The following section describes the setup of the printer in Windows 98.

If desired, please see the Windows Manual for instructions on how to set up printers.

Proceed as follows:

1. Begin the printer installation.
   The following window will appear during the installation routine:

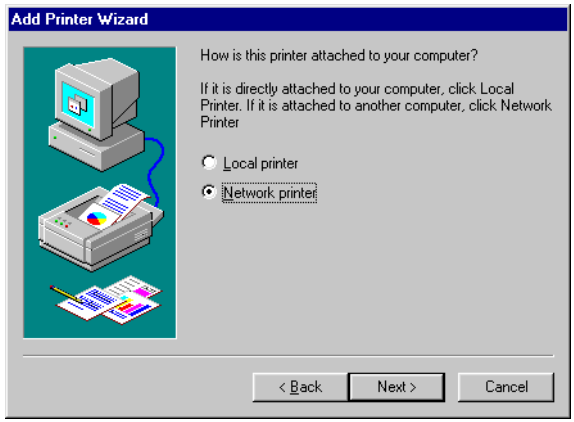

Add Printer Wizard
How is this printer attached to your computer?
If it is directly attached to your computer, click Local Printer. If it is attached to another computer, click Network Printer
Local printer
Network printer
< Back
Next >
Cancel

Fig. 4-13: Select Network printer

2. Select Network printer.
3. Click 'Next >'.
   The following window appears:

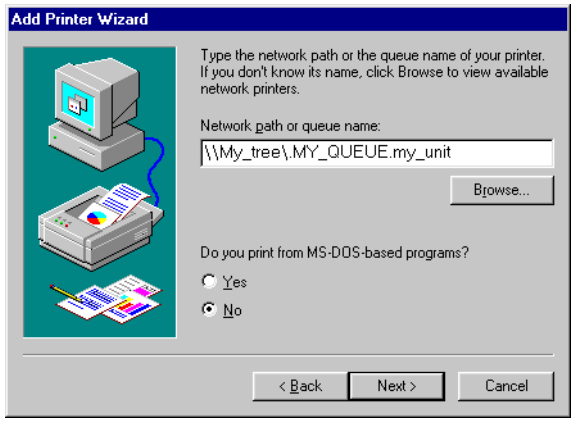

Add Printer Wizard
Type the network path or the queue name of your printer. If you don't know its name, click Browse to view available network printers.
Network path or queue name:
\\My_tree\.MY_QUEUE.my_unit
Browse...
Do you print from MS-DOS-based programs?
Yes
No
< Back
Next >
Cancel

Fig. 4-14: Select print queue

4. Select the respective print queue.
5. Follow the instructions of the installation routine.

4.5 Installing in NetWare 6/5 Networks with NDPS Gateways

The installation involves the following steps:

- Setting up the Printer Agent
- Setting up the Printer in the Novell Print Manager

There are different options involved in the set up of the printer agent:

- Novell NDPS Gateway: lpr via IP
- Novell NDPS Gateway: Remote Printer
- Novell NDPS Gateway: Print Queue-Based
- Setting up the Printer in the Novell Printer Manager

4.5.1 Novell NDPS Gateway: lpr via IP

This installation uses TCP/IP (Pure IP) as print protocol. All IPX-based communication is disabled. Status information regarding the Novell NetWare status of the print server is no longer displayed.

If you are printing via IP, Novell can be turned off on the print server. In this case the network load is reduced.

Before installation, make sure that:

✓ The print server is connected and the printer is turned on.

- ✓ The IP address is saved in the print server.
- ✓ IP has been set up on the Novell file server.
- ✓ NDPS Broker and NDPS Manager have been set up and started.

Proceed as follows:

1. Double-click the NDPS Manager in the NetWare Administrator tree.
   The following window appears:

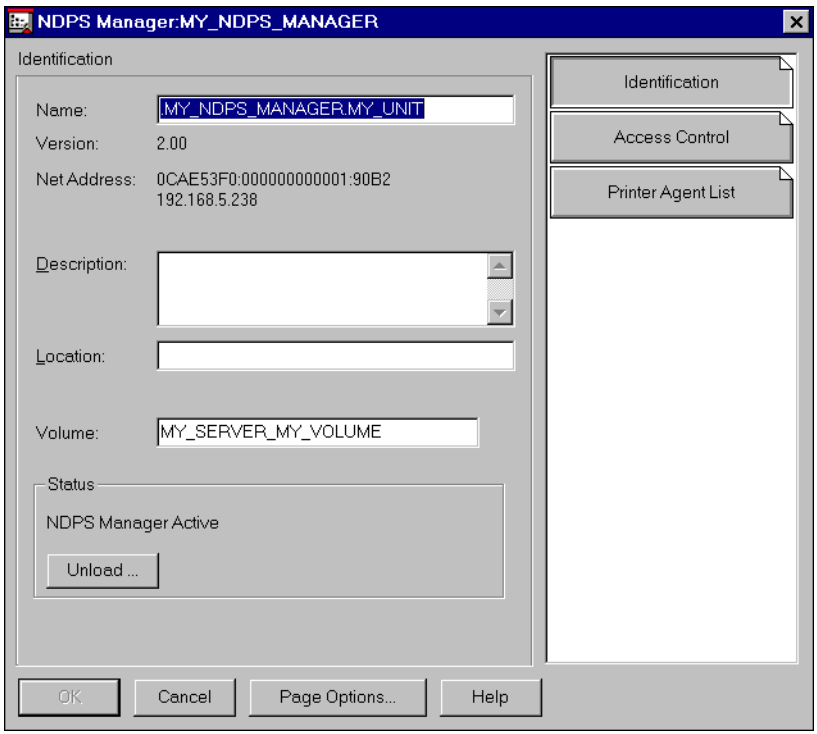


Fig. 4-15: NDPS Manager

2. Click 'Printer Agent List'.
   The following window appears:

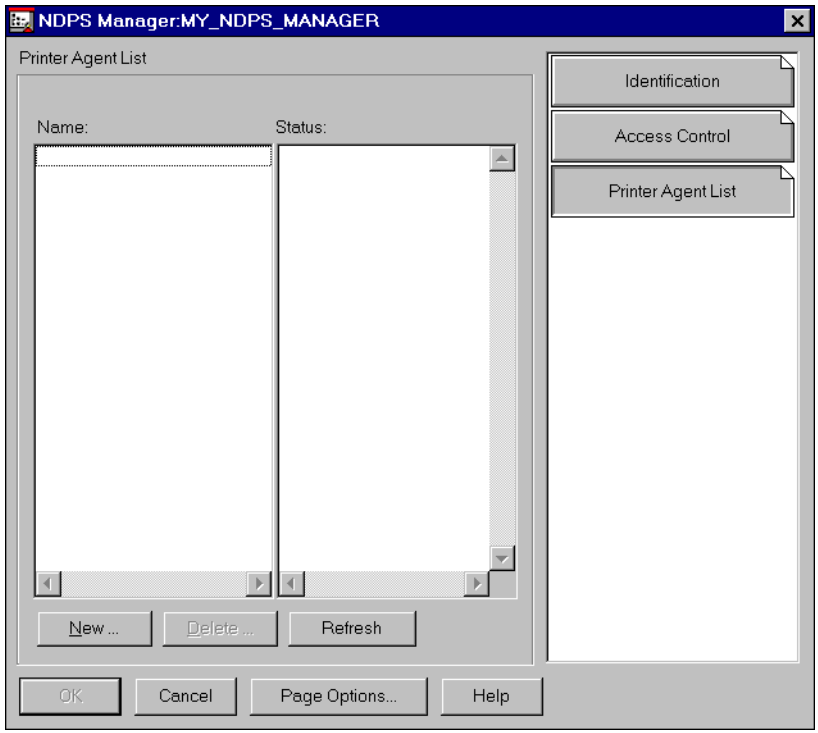


Fig. 4-16: Printer Agent List

3. Click 'New...'
   The following window appears:

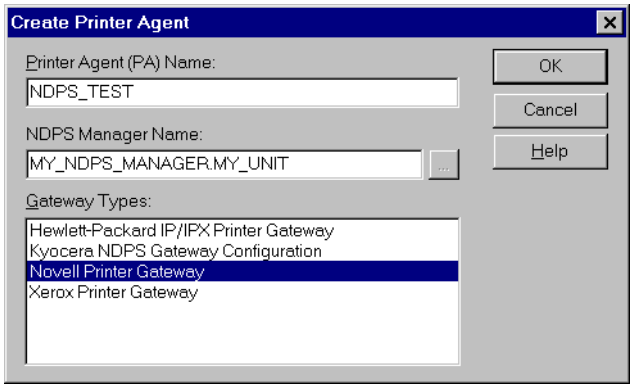


Fig. 4-17: Window 'Create Printer Agent'

4. Enter an arbitrary name in the 'Printer Agent' box.
5. Select the Novell printer gateway from the list of gateway types.
6. Click 'OK' to confirm.
   The following window appears:

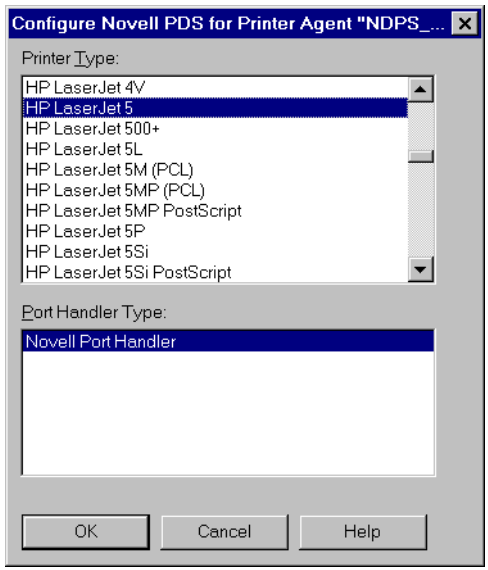


Fig. 4-18: Window 'Novell PDS for Printer Agent ...'

7. Select the printer from the list which corresponds most closely to your model.
8. Click 'OK' to confirm.
   The following window appears:

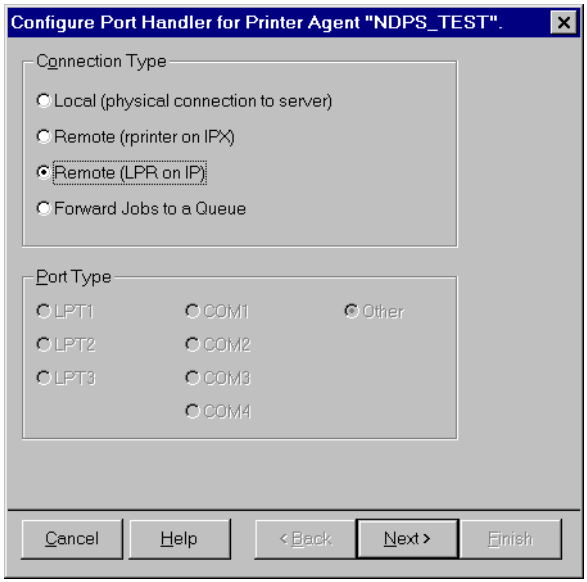


Fig. 4-19: Window 'Port Handler for Printer Agent ...'

9. Select 'Remote (LPR on IP)' as your protocol.
10. Click 'Next >'.
    The following window appears:

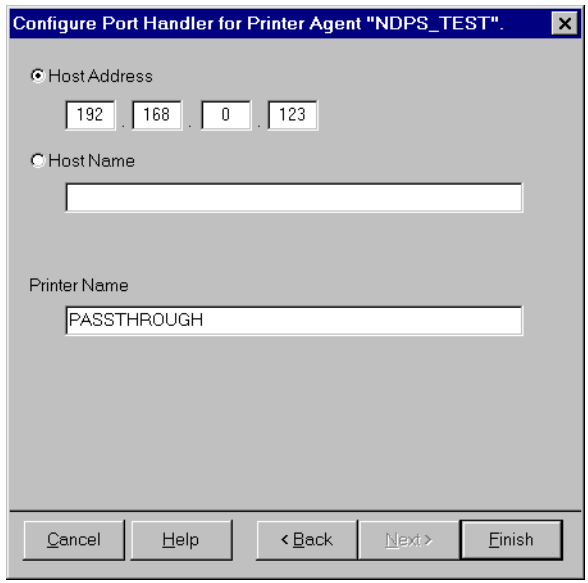


Fig. 4-20: Enter IP Address

11. Enter the IP address of the print server in the 'Host Address' box.
12. If necessary, enter a logical printer with lp1 - lp8 in the 'Printer Name' box.
    With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4). If no logical printer is defined, all print data is automatically routed to logical printer #1.
13. Click 'Finish'.
    The following window appears:

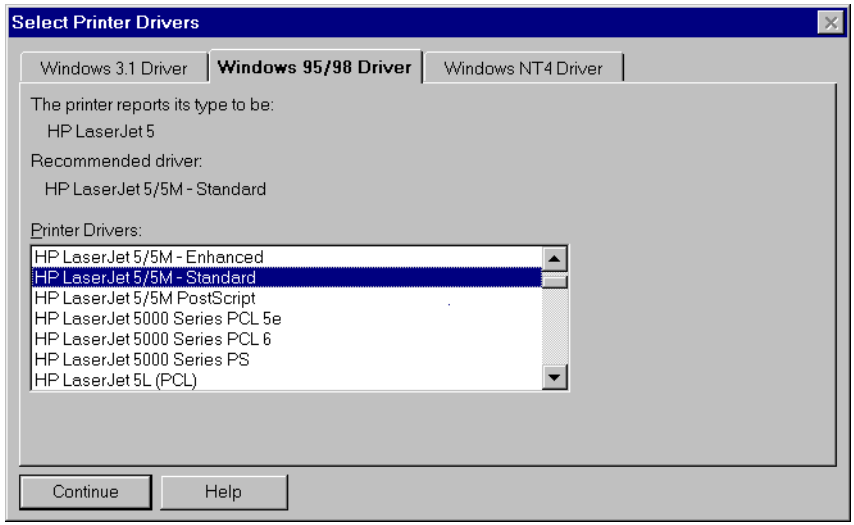


Fig. 4-21: Window 'Select Printer Drivers'

14. Select the tab for your operating system.
15. Select the printer driver for your printer.
16. Click 'Continue'.
17. Click 'OK' to confirm.

4.5.2 Novell NDPS Gateway: Remote Printer

Note that the Novell name, the remote printer name (name of the PSERVER.NLM), the printer agent name, and the SAP name must correspond!

Before installation, make sure that:

✓ The print server is connected and the printer is turned on.

- ✓ NDPS Broker and NDPS Manager have been set up and started.
- ✓ The IPX protocol is installed on every computer intended for printing.
- ✓ A Novell NetWare client is installed on the computer.

Procedure

The installation involves the following steps:

- Setting up the Printer Agent
- Configuring the PRINTSERVER
- Starting PSERVER on the File Server

4.5.2.1 Setting up the Printer Agent

Proceed as follows:

1. Double-click the NDPS Manager in the NetWare Administrator tree.
   The following window appears:

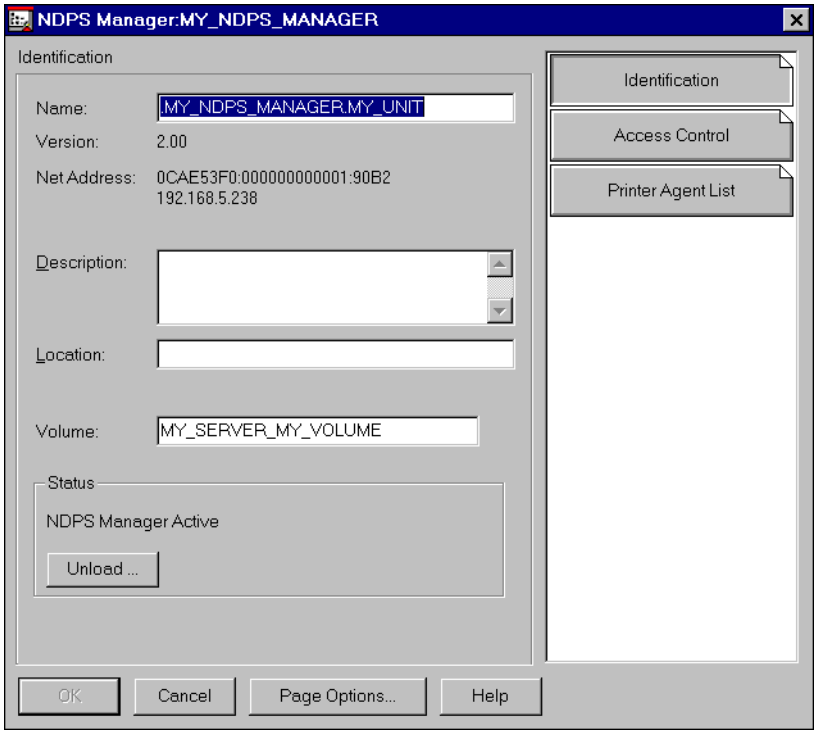


Fig. 4-22: NDPS Manager

2. Click 'Printer Agent List'.
   The following window appears:

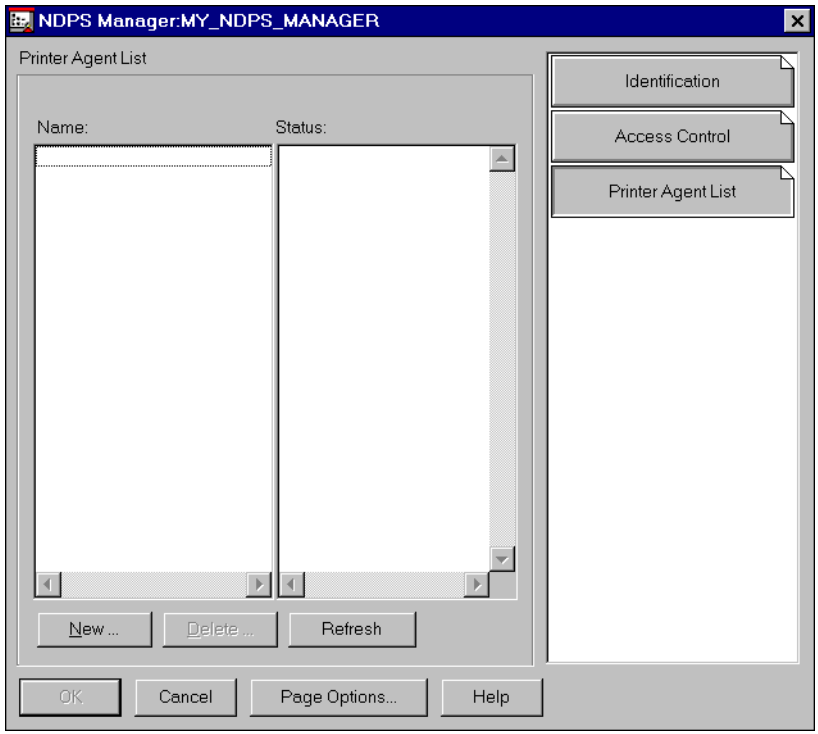


Fig. 4-23: Printer Agent List

3. Click 'New...'
   The following window appears:

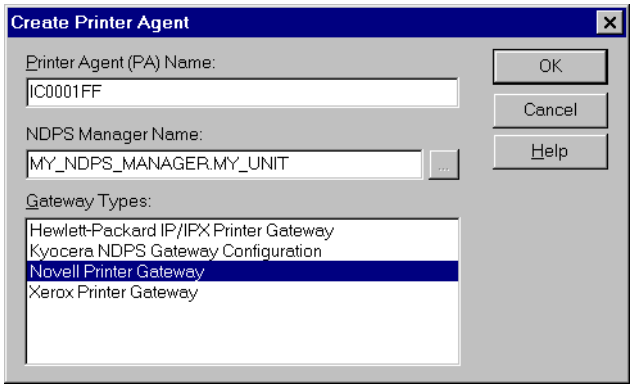


Fig. 4-24: Window 'Create Printer Agent'

4. Enter the print server name in the 'Printer Agent Name (PA-Printer Agent)' box.
   Syntax: ICxxxxxx
   Example: IC0001FF
   Here, you may also use the Novell name of the print server if you assign it using the print server homepage, the PRINTSERVER-NetTool, or the FTP parameter transfer.
5. Select the Novell printer gateway from the list of gateway types.
6. Click 'OK' to confirm.
   The following window appears:

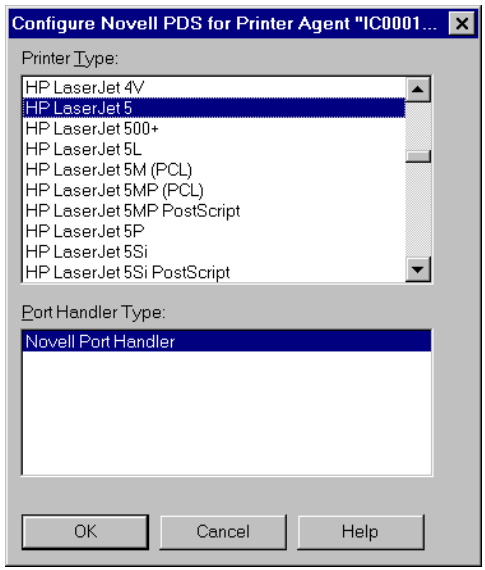


Fig. 4-25: Window 'Novell PDS for Printer Agent ...'

7. Select the printer from the list which corresponds most closely to your model.
8. Click 'OK' to confirm.
   The following window appears:

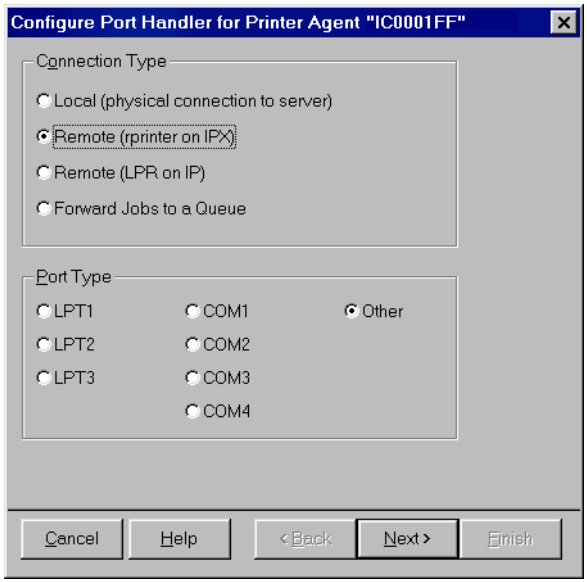


Fig. 4-26: Window 'Port Handler for Printer Agent ...'

9. Select 'Remote (rprinter on IPX)' as your protocol.
10. Select 'Other' as port type.
11. Click 'Next >'.
    The following window appears:

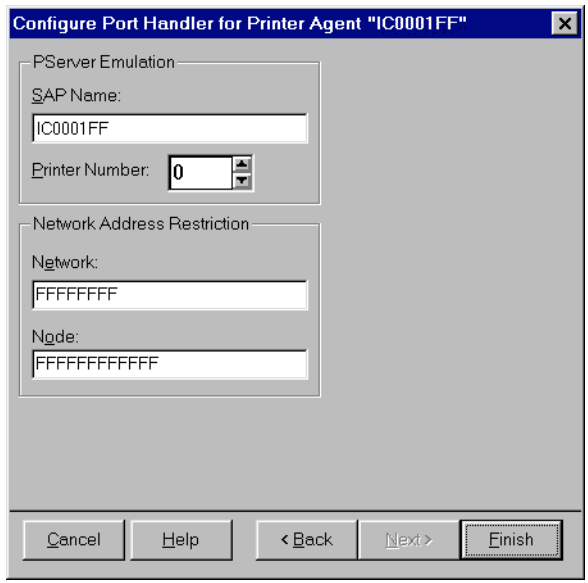


Fig. 4-27: Check SAP name

12. Check whether the SAP name corresponds to the printer agent name.
13. Click 'Finish'.
    The following window appears:

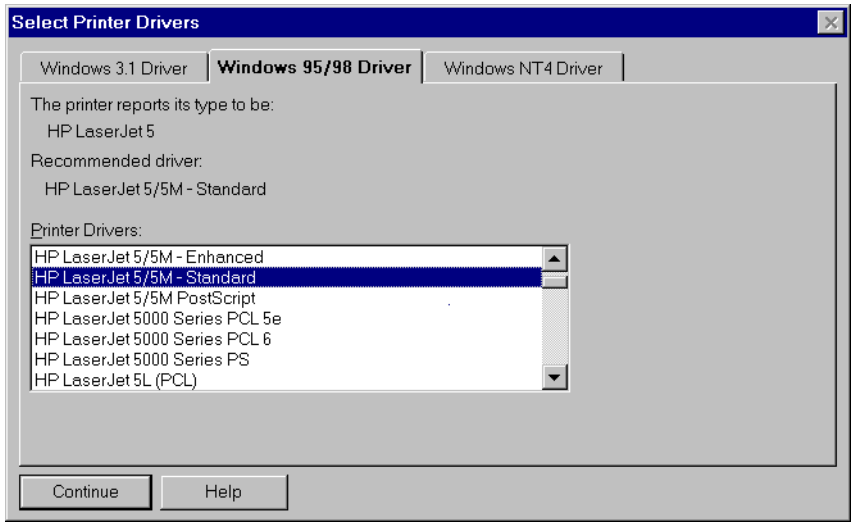


Fig. 4-28: Window 'Select Printer Drivers'

14. Select the tab for your operating system.
15. Select the printer driver for your printer.
16. Click 'Continue'.
17. Click 'OK' to confirm.

4.5.2.2 Configuring the PRINTSERVER

The name of the print server must be configured on the PRINTSERVER, so that status messages can be transferred from the print server to the file server. You can do this using either the print server homepage, the PRINTSERVER-NetTool, or the FTP parameter transfer. This section describes the configuration using the PRINTSERVER-NetTool. If you wish to use the print server homepage, please read section "Configuring Novell NetWare" on page 3-16 in the User Manual. If you wish to use the FTP

parameter transfer function, please read section "Configuring Parameters via FTP" on page B-14 in the User Manual.

Proceed as follows:

1. Start thePRINTSERVER-NetTool.
2. Double-click the print server in the print server list.
3. Select 'NetWare' from the left frame.
4. Select the 'Remote Printer Mode' tab.
   The following window appears:

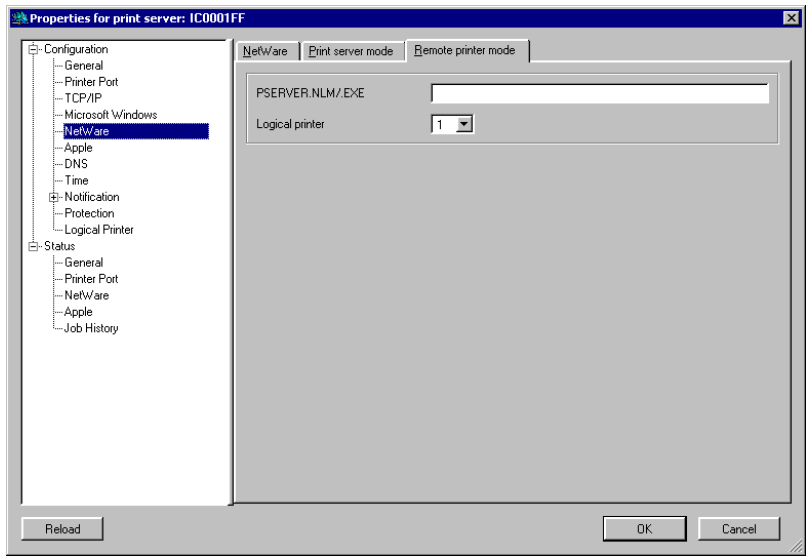


Fig. 4-29: Enter PSERVER Name

5. Enter the name of the print server in the 'PSERVER.NLM/.EXE' box.
   Example: IC0001FF

6. Select a logical printer from the 'Logical printer' box, if necessary. With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4). If no logical printer is defined, all print data is automatically routed to logical printer #1.
7. Click 'OK' to confirm.

4.5.2.3 Starting the PSERVER on the File Server

In the last step, the Novell print server must be set up on the file server in the PSERVER module in order to transfer the print data from PSERVER to the PRINTSERVER. This requires the starting up of the module PSERVER with the name of the PSERVER entered in the PRINTSERVER-NetTool.

Proceed as follows:

1. Start the PSERVER on the file server with the PSERVER name which you entered in the PRINTSERVER-NetTool.
   Syntax: LOAD PSERVER <PSERVER name>
   Example: LOAD PSERVER IC0001FF

4.5.3 Novell NDPS Gateway: Print Queue-Based

If the print server is password-protected, this password will be demanded during the installation routine. The following description includes this password demand. If no password has been assigned, you can skip the respective passages.

The installation of the print server for IP-based (Pure IP) or IPX-based printing does not differ. Only different requirements have to be met.

Requirements for IP-based Printing

Before installation, make sure that:

- ✓ The print server is connected and the printer is turned on.
- ✓ NDPS Broker and NDPS Manager have been set up and started.
- ✓ IP has been set up on the Novell server.
- ✓ A Novell NetWare client with IP support is installed on every computer intended for printing.
- ✓ The IP address is saved in the print server.
- ✓ The parameter 'Pure IP' has been activated.
- ✓ The print server is set up in the print server mode. For more information, please read the section "Installing in NetWare 6/5/4 Networks in Print Server Mode" on page 4-5.

Requirements for IPX-based Printing

Before installation, make sure that:

- ✓ The print server is connected and the printer is turned on.
- ✓ NDPS Broker and NDPS Manager have been set up and started.
- ✓ The IPX protocol is installed on every computer intended for printing.
- ✓ A Novell NetWare client is installed on the computer.
- ✓ The print server is set up in the print server mode. For more information, please read the section "Installing in NetWare 6/5/4 Networks in Print Server Mode" on page 4-5.

Proceed as follows:

1. Start RCONSOLE.
2. Double-click the NDPS Manager in the NetWare Administrator tree.
   The following window appears:

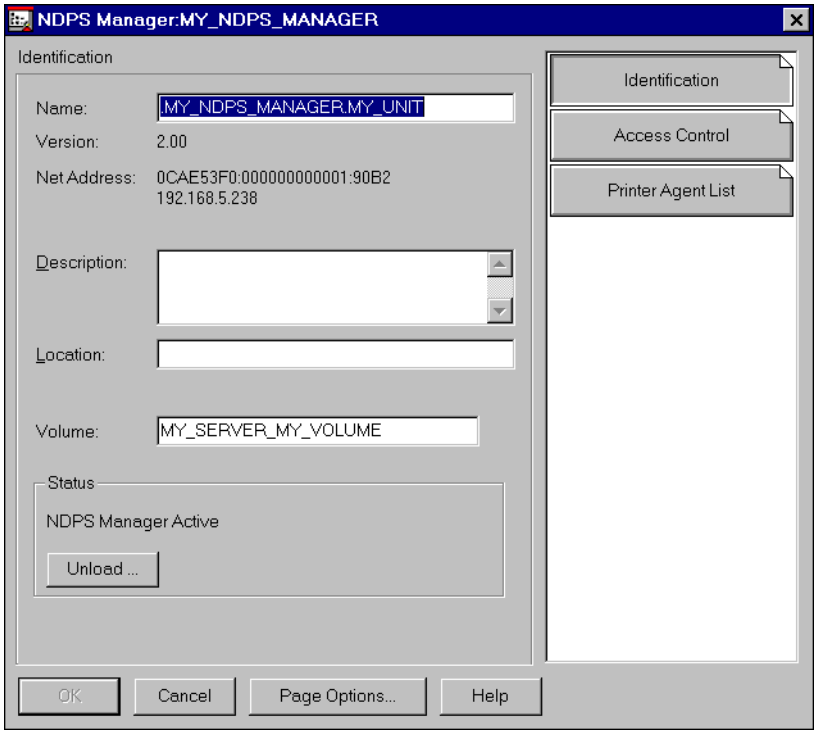


Fig. 4-30: NDPS Manager

3. Click 'Printer Agent List'.
   The following window appears:

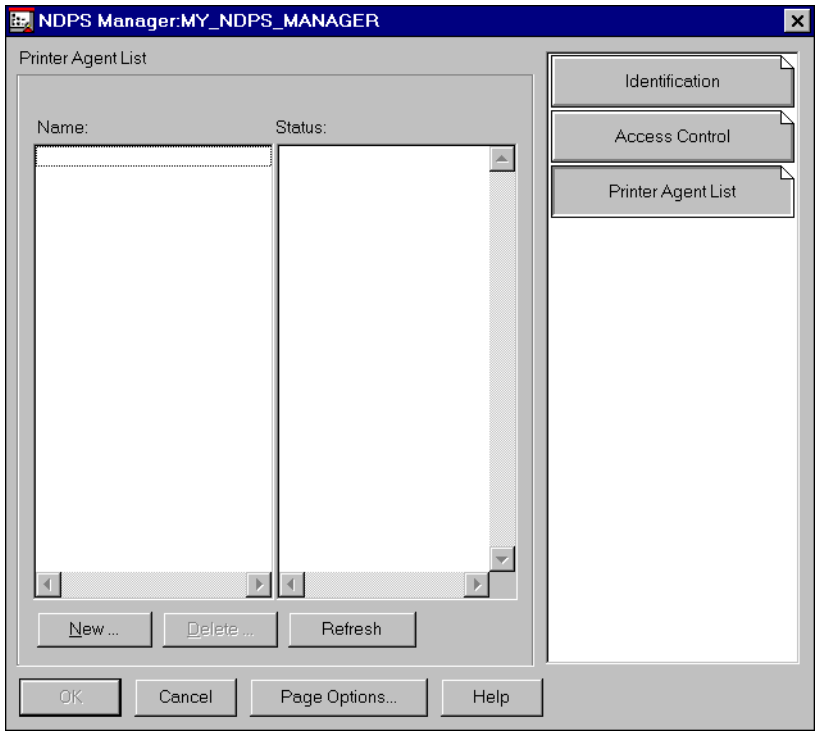


Fig. 4-31: Printer Agent List

4. Click 'New...'
   The following window appears:

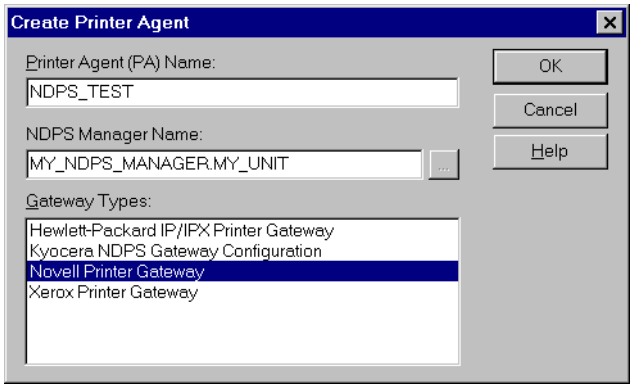


Fig. 4-32: Window 'Create Printer Agent'

5. Enter an arbitrary name in the 'Printer Agent' box.
6. Select the Novell printer gateway from the list of gateway types.
7. Click 'OK' to confirm.
   The following window appears:

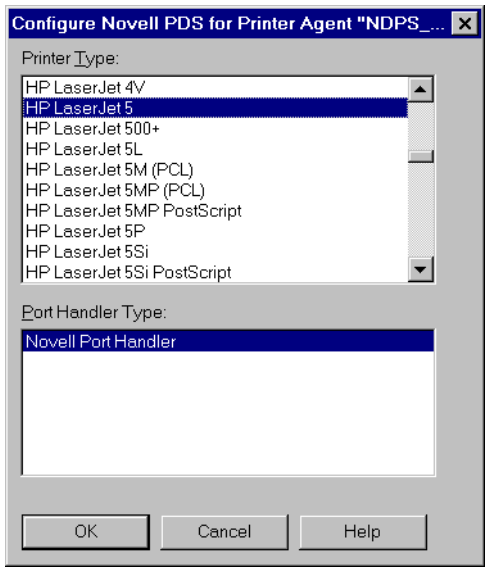


Fig. 4-33: Window 'Novell PDS for Printer Agent ...'

8. Select the printer from the list which corresponds most closely to your model.
9. Click 'OK' to confirm.
   The following window appears:

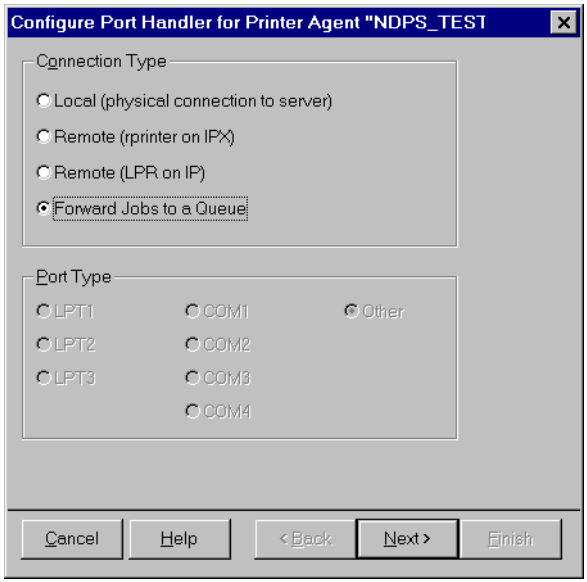


Fig. 4-34: Window 'Port Handler for Printer Agent ...'

10. Select 'Forward Jobs to a Queue' as a protocol.
11. Click 'Next >'.
    The following window appears:

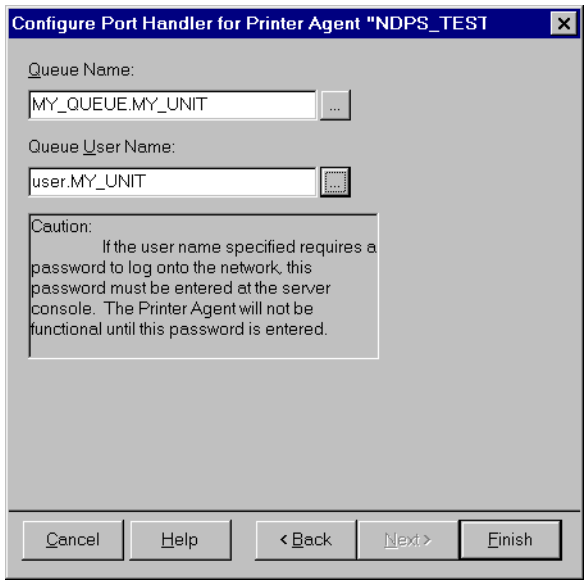

Configure Port Handler for Printer Agent "NDPS_TEST
Queue Name:
MY_QUEUE.MY_UNIT
Queue User Name:
user.MY_UNIT
Caution:
If the user name specified requires a password to log onto the network, this password must be entered at the server console. The Printer Agent will not be functional until this password is entered.
Cancel
Help
< Back
Next >
Finish

Fig. 4-35: Entries for the port handler

12. Select the print queue.
13. Select the name of the print queue user.
14. Click 'Finish'.
15. Switch to RCONSOLE.
16. Enter the user password.
17. Switch back to the printer agent.
    The following window appears:

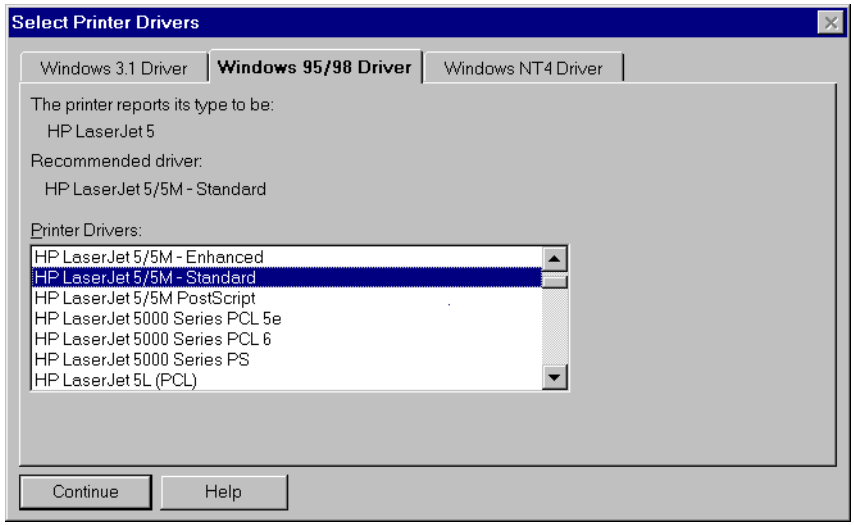


Fig. 4-36: Window 'Select Printer Drivers'

18. Select the tab for your operating system.
19. Select the printer driver for your printer.
20. Click 'Continue'.
21. Click 'OK' to confirm.
22. Select the tab for your operating system.

4.5.4 Setting up the Printer in the Novell Printer Manager

Proceed as follows:

1. Start the Novell Printer Manager.
   The following window appears:

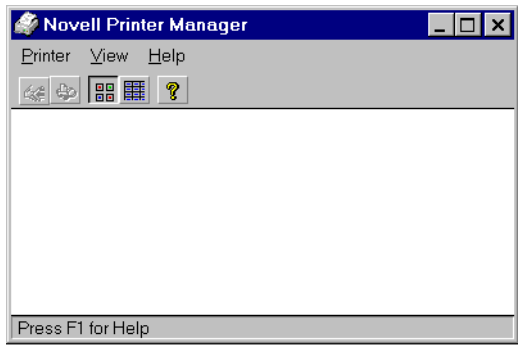


Fig. 4-37: Window 'Novell Printer Manager'

2. Select the menu item 'New…' in the 'Printer' menu. The following window appears:

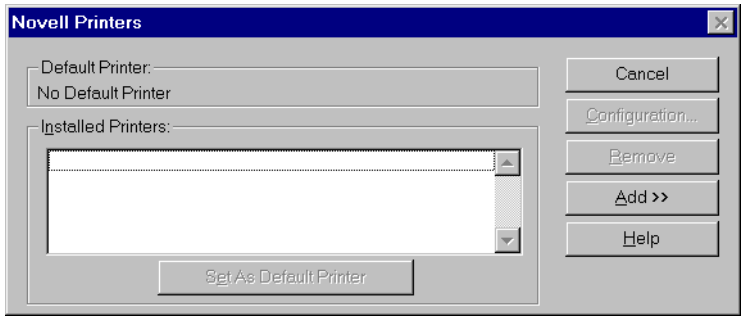


Fig. 4-38: Window 'Novell Printers'

3. Click 'Add>>'.
   The following window appears:

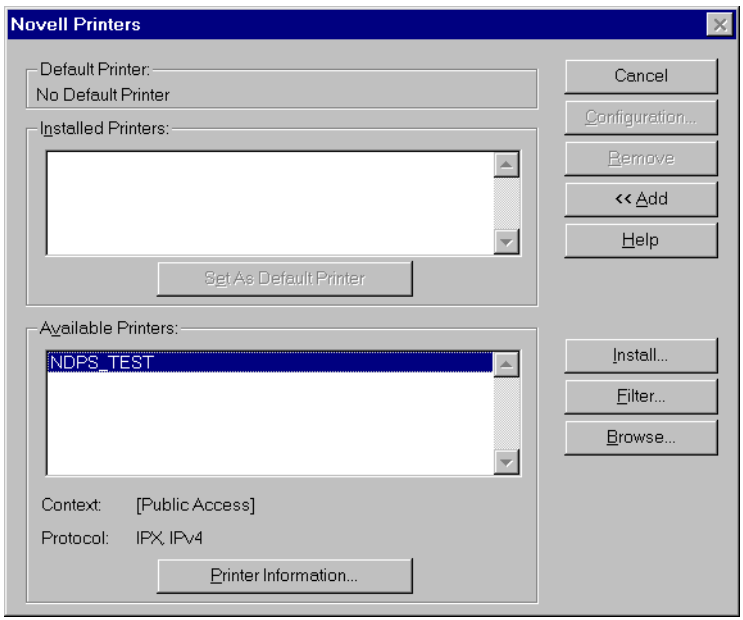


Fig. 4-39: Window 'Novell Printers' expanded

4. Select your printer from the list 'Available Printers'.
5. Click 'Install...'
   The following window appears:

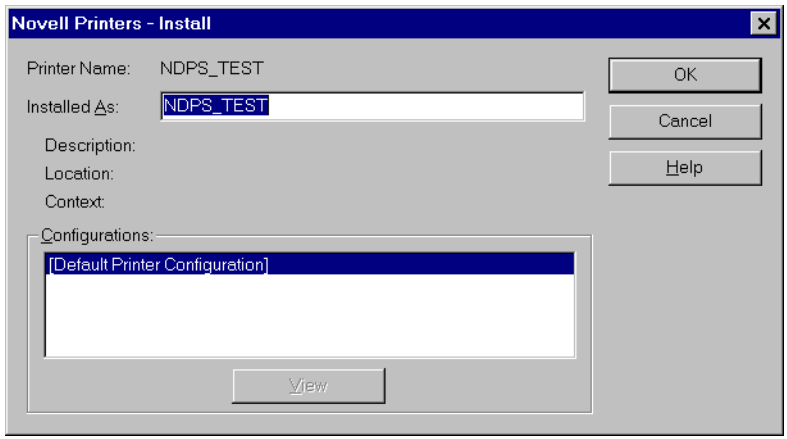


Fig. 4-40: Window 'Novell Printers - Install'

6. Click 'OK' to confirm.
7. Click 'Close'.
   The printer is now installed.

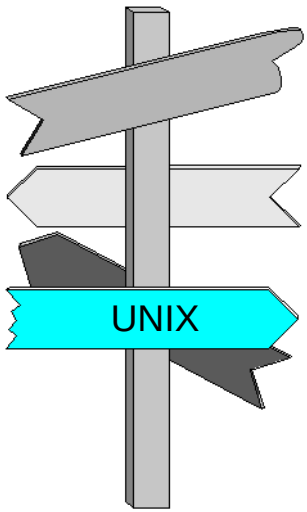
4.6 Tips and Tricks

The print server services up to a total of 16 print queues. For every extra print queue, the steps listed above must be repeated.

If the print server in Novell NetWare 4.x networks also services print queues installed on other volumes in the network, PCONSOLE can be used to select a different volume, and the installation can be repeated accordingly.

CHAPTER 5

Installation in UNIX Networks



This chapter contains information concerning the following topics:

- Basic Principles
- Assigning the IP Address to the Host Name
- Saving the IP Address in the Print Server
- Printing via the LPD Protocol
- Printing via TCP/IP Ports
- Printing via Shell Scripts

5.1 Basic Principles

Printing in UNIX networks varies depending on the UNIX system version used. The two most commonly used printing methods are remote printing via the LPD protocol and direct printing via TCP/IP ports. If both methods are not available, you can then print via shell scripts.

Printing via the LPD Protocol

Several UNIX systems support the linkage of network printers via the LPD protocol. With this method, the PRINTSERVER is integrated into the spooler as a remote printer. The user host transfers the print data to the printer by means of the print server.

Printing via TCP/IP Ports

Several UNIX systems support the linkage of network printers by means of direct TCP/IP connection. Print data can be transferred from the spooler to the print server via TCP/IP ports.

Printing via Shell Scripts

When printing via shell scripts, a printer, which the UNIX spooler considers to be local, is installed. The printer is then entered into the UNIX spooler system. The shell scripts route the print data to the print server by means of FTP. The *.sh shell scripts are sample scripts for the default printer interfaces of the 'lpsched,' 'lpd,' and 'qdaemon' spoolers supported by the print server.

The following shell scripts are available:

- aix.sh (for AIX systems)
- bsd.sh (for BSD systems)
- sys5.sh (for System V)

Printing Without a Spooler

You can also send print data directly to the print server by means of FTP while bypassing the spooler. This method of network printing is mainly used for testing the print server after installation.

Supported Spoolers

The print server supports the 'lpsched' (System V), 'lpd' (BSD), and 'qdaemon' (AIX) spoolers. Please consult your system administrator or your system manual to find out which UNIX version or spooler is installed on your computer. If your system has the '/usr/lib/lpsched' file, you most probably have System V; if your system has the '/usr/lib/lpd' and '/etc/printcap' files, you have BSD.

Procedure

The installation involves the following steps:

- Assigning the IP Address to the Host Name
- Saving the IP Address in the Print Server
- Printing via the LPD Protocol
- Printing via TCP/IP Ports
- Printing via Shell Scripts

5.2 Assigning the IP Address to the Host Name

As a rule, hosts can be addressed at the user command level ('ping,' 'ftp,' and 'tftp,' for example), with their host names, or directly with their IP addresses. The host name is most commonly used.

In this case, the host name must be assigned to the IP address. This is carried out either in the local 'etc/hosts' file or on a DNS server. The following section will describe the assignment of the host name to the IP address using the 'hosts' file. For more information, please read the relevant section in the documentation of your operating system.

Assignment Files

The assignment of the host names to the IP addresses and the IP addresses to the hardware addresses is saved in the following files:

File	Assignment
/etc/hosts	Assignment of host names to IP addresses
/etc/bootptab	Assignment of IP addresses to hardware addresses if the BOOTP boot protocol is used
/etc/rarpd.cf	Assignment of IP addresses to hardware addresses if the BOOTP boot protocol is used
/etc/ethers	Assignment of IP addresses to hardware addresses if the RARP boot protocol is used

The '/etc/hosts' file exists on every computer in the network, whereas the other files usually only exist if the listed network services are implemented. Depending on the UNIX system used, the files may also be located in different directories.

The computer from which this installation is carried out must be in the same (sub)network as the print server. Later, the printer may be located anywhere in the network.

Proceed as follows:

1. Log on as root.
2. Add the following entry into the '/etc/hosts' file:
   Syntax: <IP address> <host name>
   Example: 192.168.0.123 IC0001FF

5.3 Saving the IP Address in the Print Server

There are several methods available for saving the IP address in the print server.

For more information, please read the section "Methods of Saving the IP Address in the Print Server" on page 1-8.

Select one of the following methods:

- Saving the IP Address via BOOTP
- Saving the IP Address via RARP
- Saving the IP Address using the 'arp' and 'ping' Commands

5.3.1 Saving the IP Address via BOOTP

If the BOOTP boot protocol has been installed in your network, you must edit the '/etc/bootptab' file. The procedure is somewhat different for ULTRIX systems. If you use an ULTRIX system, please read the section "Procedure for ULTRIX" on page 5-7.

Please note that (optional) periods separate the address groups of the hardware addresses in this file, whereas colons separate fields from each other in an individual entry. In ULTRIX and some other UNIX systems, the individual fields of an entry are separated from each other using the tab character.

Proceed as follows:

1. Add the following entry to the '/etc/bootptab' file:
   Syntax for Ethernet:<host name>:ht=ether:ha=<hardware address>:ip=<IP address>
   Example for Ethernet:
   IC0001FF:ht=ether:ha=00.c0.eb.00.01.ff:ip=192.168.0.123
   Syntax for Token Ring: <host name>:ht=tr:ha=<hardware address>:ip=<IP address>
   Example for Token Ring:
   IC0001FF:ht=tr:ha=00.c0.eb.00.01.ff:ip=192.168.0.123
2. Please make sure that the 'bootp' print daemon rereads the configuration file.

Procedure for ULTRIX

Proceed as follows:

1. Add the following entry to the '/etc/bootptab' file:
   Syntax for Ethernet:
   <host name> 1 <hardware address> <IP address>
   Example for Ethernet:
   IC0001FF 1 00:c0:eb:00:01:ff 192.168.0.123
   Syntax for Token Ring:
   <host name> 6 <hardware address> <IP address>
   Example for Token Ring:
   IC0001FF 6 00:c0:eb:00:01:ff 192.168.0.123
2. Please make sure that the 'bootp' print daemon rereads the configuration file.

5.3.2 Saving the IP Address via RARP

If the RARP boot protocol has been installed in your network, you must edit either the '/etc/ethers' file or the '/etc/rarpd.cf' file.

The choice of which file to add depends on how the RARP network service was implemented on your UNIX system. For more information, please read the section concerning 'rarpd' in your UNIX documentation.

Procedure for 'rarpd.cf'

Proceed as follows:

1. Add the following entry to the '/etc/rarpd.cf' file:
   Syntax: <IP address> <hardware address>
   Example: 192.168.0.123 00:c0:eb:00:01:ff

Procedure for 'ethers'

Proceed as follows:

1. Add the following entry to the '/etc/ethers' file:
   Syntax: <hardware address> <host name>
   Example: 00:c0:eb:00:01:ff IC0001FF

5.3.3 Saving the IP Address using the 'arp' and 'ping' Commands

If the DHCP, BOOTP, and RARP boot protocols are not implemented in your system, you can use the 'arp' and 'ping' commands to save the IP address. The 'arp' command is used for editing the ARP table. The 'ping' command sends a data packet with an IP address to the hardware address of the print server. If the data packet has been successfully sent and received, the print server permanently saves the IP address.

Proceed as follows:

1. Edit the ARP table:
   Ethernet: arp -s <host name> <hardware address>
   Token Ring:arp -s 802.5 <host name><hardware address>
   AIX: arp -s ether <host name> <hardware address>
   Example: arp -s IC0001FF 00:c0:eb:00:01:ff

This permanently saves the entry in the ARP table; in other words, the entry does not expire and remains valid until the next time you turn on the UNIX computer.

2. Turn the printer off and back on. As for box and pocket print servers, disconnect and reconnect the power socket on the print server or turn the print server off and back on.
3. Check whether the print server is available by means of TCP/IP:
   Syntax: ping <host name>
   Example: ping IC0001FF

5.4 Printing via the LPD Protocol

Most UNIX systems use the LPD protocol to print in networks. In this case, the print server must be installed as a remote printer. Print options, such as a banner page, may be implemented only when printing is carried out by a logical printer. With box print servers, the port is addressed via the logical printer. For more information, please read the section "Logical Printers" on page 1-4.

The installation to your system may differ from the descriptions below. For more information, please read the description in your UNIX documentation.

Select your system from the following list:

- IBM AIX (Version 4.x)
- IBM AIX (Version 3.x)
- AIX Without SMIT
- HP-UX (Version 10.20)
- SunOS
- SCO UNIX (Version 3.2)
- UNIXWare (Version 4.2 - 1.1.2)
- System V (General)

5.4.1 IBM AIX (Version 4.x)

When installing the print server in the spooler of an AIX system as a remote printer, you must enter a print queue, a host name, and a logical printer into the '/etc/qconfig' file. In this section, installation by means of the SMIT Administration Tool is described.

Entries

The installation sequence requires the following entries:

Box in SMIT	User input	Example in the text
Name of QUEUE to add	<arbitrary name> for print queue	MY_QUEUE
HOSTNAME of remote server	<host name or IP address of the print server>	IC0001FF
Name of QUEUE of remote server	lp1to lp8 for the logical printer	lp1

With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4).

Before installation, make sure that:

- ✓ The IP address is saved in the print server.
- ✓ The host name has been assigned to the IP address.
- ✓ The print server is connected and the printer is turned on.

Proceed as follows:

1. Log on as root.
2. Start SMIT.
3. Select the following menu commands in the order shown below:
   'Devices'
   'Printer/Plotter'

'Print Spooling'
'Add a Print Queue'
'Other'

4. Enter the following parameters into the screen mask:
   [TOP]

*Name of QUEUE to add	[MY_QUEUE]
*Name of QUEUE DEVICE to add	[MY_QUEUE]
*BACKEND PROGRAM pathname	[/usr/lpd/rembak]
ACTIVATE the queue?	yes
Should this become the Default queue?	no
Queuing DISCIPLINE	first come first serve
ACCOUNTING FILE pathname	[ ]
HOSTNAME of remote server	[IC0001FF]
Name of QUEUE of remote server	[lp1]

5. Press ENTER to confirm.
6. Check whether the following entry has been added to the '/etc/qconfig' file:
   Example:
   ```
   MY_QUEUE:
           device=MY_QUEUE
           up=true
           host=IC0001FF
           rq=lp1
   MY_QUEUE:
           backend=usr/lpd/rembak
   ```
7. Change to the 'etc' directory.
8. Test the print server:
   Syntax: lp -d <host name of print server> <file name>
   Example: lp -d IC0001FF hosts

5.4.2 IBM AIX (Version 3.x)

When installing the print server in the spooler of an AIX system as a remote printer, you must enter a print queue, a host name, and a logical printer into the '/etc/qconfig' file. In this section, installation by means of the SMIT Administration Tool is described.

Entries

The installation sequence requires the following entries:

Box in SMIT	User input	Example in the text
Name of QUEUE	<arbitrary name> for print queue	MY_QUEUE
Destination HOST	<host name or IP address of the print server>	IC0001FF
Name of QUEUE for remote printer	lp1to lp8 for the logical printer	lp1

With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4).

Before installation, make sure that:

- ✓ The IP address is saved in the print server.
- ✓ The host name has been assigned to the IP address.
- ✓ The print server is connected and the printer is turned on.

Proceed as follows:

1. Log on as root.
2. Start SMIT.
3. Select the following menu commands in the order shown below:
   'Devices'
   'Printer/Plotter'
   'Manage Remote Printer Subsystem'

'Client Services'
'Remote Printer Queues'
'Add Remote Queue'

4. Enter the following parameters into the screen mask:
   Example:
   ```
   Name of QUEUE                          [MY_QUEUE]
   Queuing DISCIPLINE                     [first come first serve]
   ACTIVATE the queue?                    [yes]
   Destination HOST                       [IC0001FF]
   Pathname SHORT FILTER                  [ ]
   Pathname LONG FILTER                   [ ]
   Name of QUEUE for remote printer       [lp1]
   ```
5. Compare the entries in the queue:
   'Remote Printer Queue Devices'
6. In some cases, the queue must be restarted:
   'Manage Local Printer Subsystem'
   'Local Printer Queues'
7. Check whether the '/etc/qconfig' file contains the following entry:
   Example:
   ```
   MY_QUEUE:
   device=drp0
   up=true
   host=IC0001FF
   rq=lp1
   drp0:
   backend=usr/lpd/rembak
   ```

5.4.3 AIX Without SMIT

When installing the print server in the spooler of an AIX system as a remote printer, you must enter a print queue, a host name, and a logical printer into the '/etc/qconfig' file. In this section, manual

installation without using the SMIT Administration Tool is described.

Entries

The installation sequence requires the following entries:

Box in qconfig	User input	Example in the text
-	<arbitrary name> for print queue	MY_QUEUE
host	<host name or IP address of the print server>	IC0001FF
rq	lp1to lp8 for the logical printer	lp1

With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4).

Before installation, make sure that:

- ✓ The IP address is saved in the print server.
- ✓ The host name has been assigned to the IP address.
- ✓ The print server is connected and the printer is turned on.

Proceed as follows:

1. Stop the print daemon:
   enq -G
2. Enter the print server into the '/etc/qconfig' file:
   Syntax: <name of print queue>:
   host = <host name of print server>
   rq = <logical printer>
   device = drp0
   drp0: backend = /usr/lpd/rembak
   Example: MY_QUEUE:
   host=IC0001FF
   rq = lp1
   device = drp0

drp0: backend = /usr/lpd/rembak

With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4).

3. Start the print daemon:
   enq -U -P MY_QUEUE

5.4.4 HP-UX (Version 10.20)

The print server is installed in an HP-UX UNIX system as a remote printer using either the System Administration Manager (SAM) or directly using the Common Desktop Environment (CDE) or, in older versions, the Visual User Environment (HP VUE). Both methods differ from each other.

Before installation, make sure that:

- ✓ The IP address is saved in the print server.
- ✓ The host name has been assigned to the IP address.
- ✓ The print server is connected and the printer is turned on.

Procedure for SAM

Proceed as follows:

1. Start the SAM Administration Tool.
2. Click 'Printers and Plotters.'
3. Click 'LP Spooler.'
4. Click 'Printers and Plotters.'
5. Select 'Add Remote Printer/Plotter...' on the 'Actions' menu. The following window appears:

Add Remote Printer

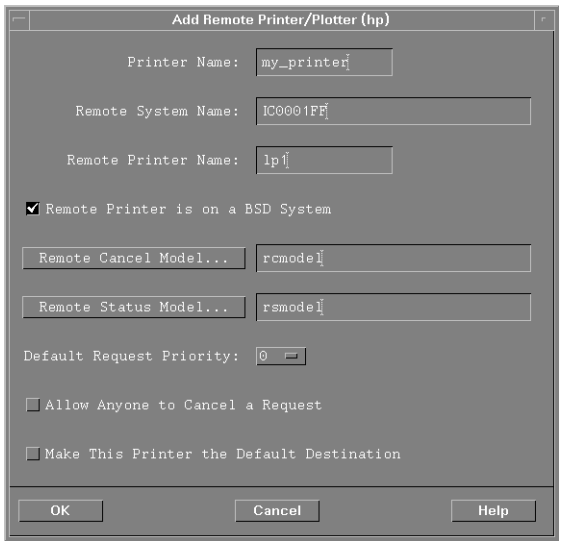


Fig. 5-1: 'Add Remote Printer/Plotter' window

6. Enter an arbitrary printer name into the 'Printer Name' box:
   Example: my_printer
7. Enter the host name of the print server into the 'Remote System Name' box:
   Example: IC0001FF
8. Enter a logical printer (lp1 - lp8) into the 'Remote Printer Name' box:
   Example: lp1
   With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4).
9. Select the 'Remote Printer is on a BSD System' check box:
   Examplel: [✓] Remote Printer is on a BSD System.
10. Click 'OK' to confirm.

Procedure for HP VUE

Proceed as follows:

1. Start HP VUE.

2. Start the Printer/Plotter Manager.
3. Select 'Printers/Plotters' on the 'List' menu.
4. Select 'Add Remote Printer/Plotter...' on the 'Actions' menu.
5. Enter an arbitrary printer name into the 'Printer Name' box:
   Example: my_printer
6. Enter the host name of the print server into the 'Remote System Name' box:
   Example: IC0001FF
7. Enter a logical printer (lp1 - lp8) into the 'Remote Printer Name' box:
   Example: lp1
   With box print servers, the port is addressed via the logical printer (see)
8. Select the 'Remote Printer is on a BSD System' check box:
   Examplel: [✓] Remote Printer is on a BSD System.

The print server status can be viewed using the Printer/Plotter Manager or the 'lpstat' shell program.

5.4.5 SunOS

When installing the print server in SunOS systems, you must enter the print server into the '/etc/printcap' file.

Before installation, make sure that:

- ✓ The IP address is saved in the print server.
- ✓ The host name has been assigned to the IP address.
- ✓ The print server is connected and the printer is turned on.

Proceed as follows:

1. Add the following entry to the '/etc/printcap' file:
   Syntax: <printer name>:\
   :lp=:rm=<host name>:rp<logical printer>:
   Example: my_printer:\
   :lp=:rm=IC0001FF:rp=lp1:
   With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4).
2. Enable the printer:
   Syntax: lpc
   lpc> enable <printer name>
   lpc> start <printer name>
   lpc> quit
   Example: lpc
   lpc> enable my_printer
   lpc> start my_printer
   lpc> quit

5.4.6 SCO UNIX (Version 3.2)

In SCO 3.2 systems, remote line printing (RLP) is used. When installing the print server, you must first install RLP in the SCO server and then install the print server as a remote printer.

Before installation, make sure that:

- ✓ The IP address is saved in the print server.
- ✓ The host name has been assigned to the IP address.
- ✓ The print server is connected and the printer is turned on.

Proceed as follows:

1. Log on as root.

2. Install RLP:
   mkdev rlp
   Do you want to install or remove remote printing? (i/r/q)i
   Do you wish to change the printer description file
   /etc/printcap? (y/n)y
3. Enter the following parameters:
   Please enter the printer name (q to quit): myprinter
   Is myprinter a remote printer or local printer (r/l)? r
   Please enter name of the remote host that myprinter is attached
   to: IC0001FF
   Printer myprinter is connected to host IC0001FF
   Is this correct? (y/n) y
   Do you want to start remote daemon now? (y/n) y
4. Change the 'rp' entry in the '/etc/printcap' file:
   Starting line in /etc/printcap:
   :lp=:rm=IC0001FF:rp=myprinter:sd=/usr/spool/lpd/myprinter
   Change in:
   :lp=:rm=IC0001FF:rp=lp1:sd=/usr/spool/lpd/myprinter
5. Restart your system.
6. Test the new printer:
   lpstat -t myprinter

5.4.7 UNIXWare (Version 4.2 - 1.1.2)

When installing the print server in UNIXWare systems, you must install the print server as a remote printer and then enable it.

Before installation, make sure that:

- ✓ The IP address is saved in the print server.
- ✓ The host name has been assigned to the IP address.
- ✓ The print server is connected and the printer is turned on.

Proceed as follows:

1. Enter the print server into the spooler as a remote printer:
   Syntax: lpsystem -t bsd <host name>
   Example: lpsystem -t bsd IC0001FF
2. Install a remote printer:
   Syntax: lpadmin -p <printer name> -s <host name>!<logical printer>
   Example: lpadmin -p my_printer -s IC0001FF!lp1 -I pcl
   With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4).

The -I pcl parameter indicates that LF (Line Feed) is converted into CR+LF (Carriage Return + Line Feed). The -I " " parameter indicates that binary data is not changed.

3. Enable the printer:
   Syntax: accept <printer name>
   enable <printer name>
   Example: accept my_printer
   enable my_printer

5.4.8 System V (General)

When installing the print server in System V systems, you must install the print server as a remote printer and then enable it.

Before installation, make sure that:

- ✓ The IP address is saved in the print server.
- ✓ The host name has been assigned to the IP address.
- ✓ The print server is connected and the printer is turned on.

Proceed as follows:

1. Log on as root.
2. Enter the print server into the spooler as a remote printer:
   Syntax: lpsystem -t bsd <host name>
   Example: lpsystem -t bsd IC0001FF
3. Install a remote printer:
   Syntax: lpadmin -p <printer name> -s <host name>!<logical printer>
   Example: lpadmin -p my_printer -s IC0001FF!lp1
   With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4).
4. Enable the printer:
   Syntax: accept <printer name>
   enable <printer name>
   Example: accept my_printer
   enable my_printer

5.5 Printing via TCP/IP Ports

If the LPD protocol is not available, such as in SINIX SPOOL networks, you can use direct TCP/IP ports for printing. If this is the case, you must configure the port number. To do this, you must install a printer port and enter the port number.

For more information, please read the section "TCP/IP Ports" on page 1-15.

5.5.1 SINIX SPOOL V4.x/XPrint

When installing the print server in SINIX SPOOL V4.x or XPrint systems, you must install a server, a supervisor, and a printer.

Before installation, make sure that:

- ✓ The IP address is saved in the print server.
- ✓ The host name has been assigned to the IP address.
- ✓ The print server is connected and the printer is turned on.

Proceed as follows:

1. Install a new server in the spooler:
   Syntax: xpadd -srv <server name> -sp <time control>
   Example: xpadd -srv server1 -sp PRIORITY
2. Install a new supervisor in the spooler:
   Syntax: xpadd -spv <supervisor> -se <server name>
   Example: xpadd -spv admin -se server1

3. Add a new printer:
   Syntax: xpadd -dev <printer name>
   -da <host name> <TCP/IP port>
   -su <supervisor> -co <connection>
   -aa -pc <printer control language>
   Example: xpadd -dev my_printer
   -da IC0001FF 9100
   -su admin -co LAN
   -aa -pc HP-LASERJET
4. Activate the printer:
   Syntax: xpchange -dev <printer name> -st <status>
   -si <job acceptance> -so <job processing>
   Example: xpchange -dev my_printer -st ACTIVE
   -si ON -so ON
5. Test the printer:
   Syntax: xpadd -job -dr <file name> -de <printer name>
   Example: xpadd -job -dr /etc/hosts -de my_printer

5.6 Printing via Shell Scripts

You should only print via shell scripts if you are not able to print by means of LPD protocols or direct TCP/IP ports.

The following shell scripts are available:

- aix.sh (for AIX systems with 'qdaemon' spooler)
- bsd.sh (for BSD systems with 'lpd' spooler)
- sys5.sh (for System V with 'lpsched' spooler)

If you wish to print via shell scripts, they must first be transferred from the print server and then adapted to the respective UNIX network.

Log Files in Case of Error

The operating sequence of the print job will be recorded in a log file having the name of the printer and the extension '.last' in the '/tmp' directory. This file contains, among other things, the start time of the print job, the parameters with which the printer interface was called, and the output of the FTP command. In case of an error, this data provides information concerning the causes of the error.

The following instructions describe only the most fundamental procedures for the corresponding shell scripts. Depending on your UNIX system, the individual commands may differ from the description. For more information, please read the description in your UNIX documentation.

Before installation, make sure that:

- ✓ The IP address is saved in the print server.
- ✓ The host name has been assigned to the IP address.
- ✓ The print server is connected and the printer is turned on.

Procedure

The installation involves the following steps:

- Creating the Print Server Directories
- Integrating Shell Scripts into System V Systems
- Integrating Shell Scripts into BSD Systems
- Integrating Shell Scripts into AIX Systems

5.6.1 Creating the Print Server Directories

All files that the print server specifically requires should be placed in the '/etc/printserver' directory. In order to print via shell scripts, the shell scripts must be transferred from the print server to the '/etc/printserver' directory via FTP.

Proceed as follows:

1. Log on as root.
2. Create the '/etc/printserver/interfaces' directory:
   cd /etc
   mkdir printserver
   cd printserver
   mkdir interfaces
3. Open an FTP connection to the print server:
   Syntax: ftp <IP Address>
   Example: ftp 192.168.0.123
4. Download the shell scripts from the print server to the '/etc/printserver' directory:
   Example: mget *.sh

5.6.2 Integrating Shell Scripts into System V Systems

If the shell scripts are located in the '/etc/printserver' directory, you must adapt them and integrate them into the spooler.

Entries

The installation sequence requires the following entries:

User input	Example in the text
Name of the adapted shell script	my_script
Name of the zero device	my_device
Name of the printer (visible to the user after installation)	my_printer

All three names may be assigned arbitrarily. You may also use one name for all three entries. Every assigned name, however, must be used continuously throughout the installation sequence.

Procedure

The installation involves the following steps:

- Adapting the Shell Script
- Creating the Printer Device
- Entering the Printer into the Spooler System
- Enabling the Printer

5.6.2.1 Adapting the Shell Script

The shell script must be adapted to your network. A copy of the shell script is therefore created and saved in the '/etc/printserver/interfaces' directory. After that, the shell script is adapted to your system. This basically means that the host name of the print server, the logical printer, and the FTP path must be

edited. With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4).

For more information, please read the section "Description of Variables" on page A-4.

Proceed as follows:

1. Copy the '/etc/printserver/sys5.sh' file into the '/etc/printserver/interfaces' subdirectory and assign the copy an arbitrary name:
   Syntax: cd /etc/printserver
   cp sys5.sh interfaces/<shell script name>
   Example: cd /etc/printserver
   cp sys5.sh interfaces/my_script
2. Change to the '/etc/printserver/interfaces' subdirectory.

Depending on the current spooler implementation, you may need to change the access rights for the shell script. For more information, please read the section concerning 'rarpd' in your UNIX documentation.

3. Change the default values of the HOST, PORTS, and FTP variables in the new shell script.

5.6.2.2 Creating the Printer Device

The print spooler requires a printer device. Due to the fact that the print server does not need a physical device, a link is made to a zero device.

Proceed as follows:

1. Enter the following command:
   Syntax: ln -f /dev/null /dev/<zero device name>
   Example: ln -f /dev/null /dev/my_device

5.6.2.3 Entering the Printer into the Spooler System

In order to enter the printer into the spooler system, the print spooler must be stopped. The new printer, the zero device, and the shell script are then entered, and the print spooler is restarted.

Certain UNIX implementations allow a new printer to be entered without stopping the print spooler. For more information, please read the description in your UNIX documentation.

The spooler is administered using the 'lpadmin' command. You may have to enter the complete path ('/usr/lib/lpadmin,' for example) if the 'lpadmin'command is used. The '-F beginning' option determines that the print jobs are restarted whenever an error occurs. The '-o nobanner' option allows you to deactivate the banner page during print job transmission. These options are not available in all 'lpadmin' command implementations. These commands are not available for HP-UX and BULL OS, for example. Please note that no space is allowed between a flag and its value.

Proceed as follows:

1. Enter the following command:
   Syntax: lpshut
   lpadmin -p <printer name> \
   -v /dev/<zero device name> \
   -i /etc/printserver/interfaces/<script name>\

```
                -F beginning -o nobanner
                /usr/lib/lpsched
Example:        lpadmin -p my_printer \
                -v /dev/my_device \
                -i /etc/printserver/interfaces/my_script \
                -F beginning -o nobanner
                /usr/lib/lpsched
```

Several UNIX systems show a warning indicating that other users are permitted to access the zero device. You may ignore this warning.

5.6.2.4 Enabling the Printer

Once the printer has been entered into the spooler system, you must enable the printer so that print jobs can be accepted.

Proceed as follows:

1. Enter the following command:
   Syntax: accept <printer name>
   enable <printer name>
   Example: accept my_printer
   enable my_printer
2. Test the new printer:
   Syntax: lp -d<printer name> /etc/printserver/<file>
   Example: lp -dmy_printer /etc/printserver/sys5.sh

5.6.3 Integrating Shell Scripts into BSD Systems

If the shell scripts are located in the '/etc/printserver' directory, you must adapt them and integrate them into the spooler.

Entries

The installation sequence requires the following entries:

User input	Example in the text
Name of the adapted shell script	my_script
Name of the zero device	my_device
Name of the spool directory	my_spool
Name of the printer (visible to the user after installation)	my_printer

All four names may be assigned arbitrarily. You may also use one name for all four entries. Every assigned name, however, must be used continuously throughout the installation sequence.

Procedure

The installation involves the following steps:

- Adapting the Shell Script
- Creating the Printer Device
- Creating the Spool Directory
- Entering the Printer into the Spooler System
- Enabling the Printer

5.6.3.1 Adapting the Shell Script

The shell script must be adapted to your network. A copy of the shell script is therefore created and saved in the

'/etc/printserver/interfaces' directory. After that, the shell script is adapted to your system. This basically means that the host name of the print server, the logical printer, and the FTP path must be edited. With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4).

For more information, please read the section "Description of Variables" on page A-4.

Proceed as follows:

1. Copy the '/etc/printserver/bsd.sh' file into the '/etc/printserver/interfaces' subdirectory and assign the copy an arbitrary name:
   Syntax: cd /etc/printserver
   cp bsd.sh interfaces/<shell script name>
   Example: cd /etc/printserver
   cp bsd.sh interfaces/my_script
2. Change to the '/etc/printserver/interfaces' subdirectory.
3. Change the access rights of the created file:
   Syntax: chmod 755 <shell script name>
   Example: chmod 755 my_script
4. Change the default values of the HOST, PORTS, and FTP variables in the new shell script.

5.6.3.2 Creating the Printer Device

The print spooler requires a printer device. Due to the fact that the print server does not need a physical device, a link is made to a zero device.

Proceed as follows:

1. Enter the following command:
   Syntax: ln -f /dev/null /dev/<zero device name>
   Example: ln -f /dev/null /dev/my_device

5.6.3.3 Creating the Spool Directory

You must now create a spool directory with access rights for the print server.

Proceed as follows:

1. Enter the following command:
   Syntax: mkdir /usr/spool/<spool dir. name>
   chmod 770 /usr/spool/<spool dir. name>
   chown daemon /usr/spool/<spool dir. name>
   chgrp daemon /usr/spool/<spool dir. name>
   Example: mkdir /usr/spool/my_spool
   chmod 770 /usr/spool/my_spool
   chown daemon /usr/spool/my_spool
   chgrp daemon /usr/spool/my_spool

5.6.3.4 Entering the Printer into the Spooler System

In order to enter the printer into the spooler system, a new entry must be made into the '/etc/printcap' file.

The first line of this entry must start at the beginning of the line, the following entries are preceded by a tab character. All lines belonging to one entry must have a backslash (\) character at the end of a line. No other character is allowed between the last

character in a line and the backslash. The backslash character itself must be the last character in a line.

Proceed as follows:

1. Add the following entry to the '/etc/printcap' file:
   Syntax: <printer name>:\
   :lp=/dev/<zero device name>:\
   :of=/etc/printserver/interfaces/<script name>:\
   :sd=/usr/spool/<spool dir. name.>:
   Example: my_printer:\
   :lp=/dev/my_device:\
   :of=/etc/printserver/interfaces/my_script:\
   :sd=/usr/spool/my_spool:

In order to print out PostScript files, the entry in '/etc/printcap' must contain the 'sh' (suppress header) flag. In this case, the entry appears as follows:
<printer name>:\
:lp=/dev/<zero device name>:\
:of=/etc/printserver/interfaces/<shell script name>:\
:sd=/usr/spool/<spool dir. name>:sh:

5.6.3.5 Enabling the Printer

Once the printer has been entered into the spooler system, you must enable the printer so that print jobs can be accepted.

Proceed as follows:

1. Enter the following command:
   Syntax: lpc
   lpc> enable <printer name>
   lpc> start <printer name>

```
                lpc> quit
Example:        lpc
                lpc> enable my_printer
                lpc> start my_printer
                lpc> quit
```

2. Test the new printer:
   Syntax: lpr -P<printer name> /etc/printserver/<file>
   Example: lpr -Pmy_printer /etc/printserver/bsd.sh

5.6.4 Integrating Shell Scripts into AIX Systems

If the shell scripts are located in the '/etc/printserver' directory, you must adapt them and integrate them into the spooler.

Entries

The installation sequence requires the following entries:

User input	Example in the text
Name of the adapted shell script	my_script
Name of the zero device	my_device
Name of the printer (visible to the user after installation)	my_printer

All three names may be assigned arbitrarily. You may also use one name for all three entries. Every assigned name, however, must be used continuously throughout the installation sequence.

Procedure

The installation involves the following steps:

- Adapting the Shell Script
- Creating the Printer Device
- Entering the Printer into the Spooler System
- Enabling the Printer

5.6.4.1 Adapting the Shell Script

The shell script must be adapted to your network. A copy of the shell script is therefore created and saved in the '/etc/printserver/interfaces' directory. After that, the shell script is adapted to your system. This basically means that the host name of the print server, the logical printer, and the FTP path must be edited. With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4).

For more information, please read the section "Description of Variables" on page A-4.

Proceed as follows:

1. Copy the '/etc/printserver/aix.sh' file into the '/etc/printserver/interfaces' subdirectory and assign the copy an arbitrary name:
   Syntax: cd /etc/printserver
   cp aix.sh interfaces/<shell script name>
   Example: cd /etc/printserver
   cp aix.sh interfaces/my_script
2. Change to the '/etc/printserver/interfaces' subdirectory.
3. Change the default values of the HOST, PORTS, and FTP variables in the new shell script.

4. Change the access rights of this file:
   Syntax:
   chmod 2555 /etc/printserver/interfaces/<script name>
   chown bin /etc/printserver/interfaces/<script name>
   chgrp printq /etc/printserver/interfaces/<script name>
   Example:
   chmod 2555 /etc/printserver/interfaces/my_script
   chown bin /etc/printserver/interfaces/my_script
   chgrp printq /etc/printserver/interfaces/my_script

5.6.4.2 Creating the Printer Device

The print spooler requires a printer device. Due to the fact that the print server does not need a physical device, a link is made to a zero device.

Proceed as follows:

1. Enter the following command:
   Syntax: ln -sf /dev/null /dev/<zero device name>
   Example: ln -sf /dev/null /dev/my_device

5.6.4.3 Entering the Printer into the Spooler System

The AIX print spooler is administered by means of the 'mkque' command.

Proceed as follows:

1. Enter the following command:
   Syntax: mkque -q<printer name> -a"up = ""TRUE' &&
   mkquedev \

```
                -q<printer name> -d<printer name> \
                -a"file = /dev/<zero device name>" \
                -a"backend = /etc/printserver/interfaces/<script>"
Example:        mkque -qmy_printer -a"up = "'TRUE' && 
                mkquedev \
                -qmy_printer -dmy_printer \
                -a"file = /dev/my_device" \
                -a"backend = /etc/printserver/interfaces/my_script"
```

You may have to enter the full path ('/usr/lib/mkque,' for example) when using the 'mkque' command.

5.6.4.4 Enabling the Printer

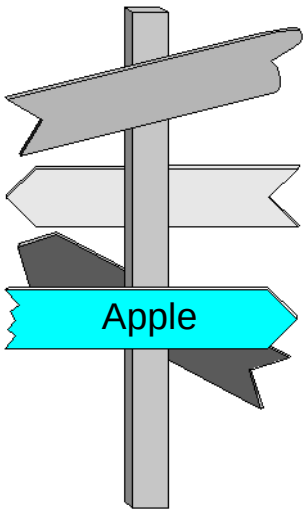
Once the printer has been entered into the spooler system, you must enable the printer so that print jobs can be accepted.

Proceed as follows:

1. Enter the following command:
   Syntax: enq -U -P<printer name>
   Example: enq -U -Pmy_printer

CHAPTER 6

Installation in Apple Networks



This chapter contains information concerning the following topics:

- Installation in Mac OS X Networks
- Installation in Mac OS 9/8 Networks

6.1 Installation in Mac OS X Networks

6.1.1 Basic Principles

TCP/IP printer

In Mac OS X networks, the print server can be installed in many ways. The following section describes the installation of a TCP/IP printer.

Print Center

The installation is done using the Print Center which can be called under Programs - Utility program.

Pocket and Box Print Servers in Apple Networks

All pocket and box print servers support the Adobe protocols TBCP and BCP. These protocols allow you to print in the so-called binary mode with suitable PostScript printers. The TBCP protocol is used as default setting. For more information, please read the section "Configuring AppleTalk" on page 4-22 of the User Manual.

Bidirectional Communication

All print servers support bidirectional communication between the printer and the host. The print server forwards all requests directly to the printer or host, so that a direct communication between the host and the printer is possible. The bidirectional communication is used as default setting. The bidirectional communication for pocket and box print servers may also be disabled, if it is not supported by the printers that are connected to the parallel interface. For more information, please read the section "Configuring AppleTalk" on page 4-22 of the User Manual.

6.1.2 Installing the Print Server

Proceed as follows:

1. Start the Print Center.
   The following window appears:

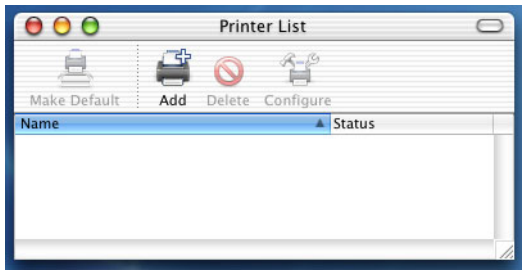


Fig. 6-1: Printer List

2. Click 'Add.'
   The following window appears:

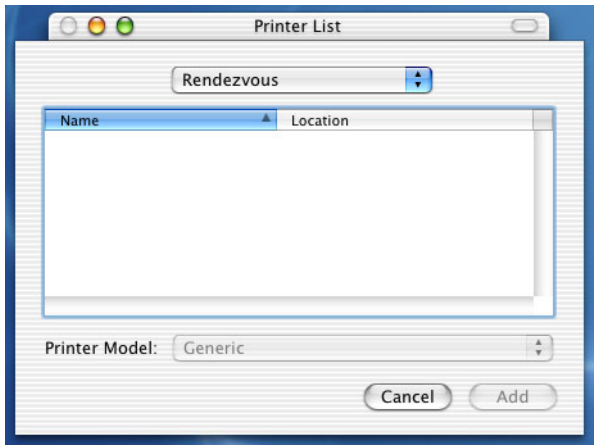


Fig. 6-2: Add Printer

3. Select 'TCP/IP Printer' from the upper list box:

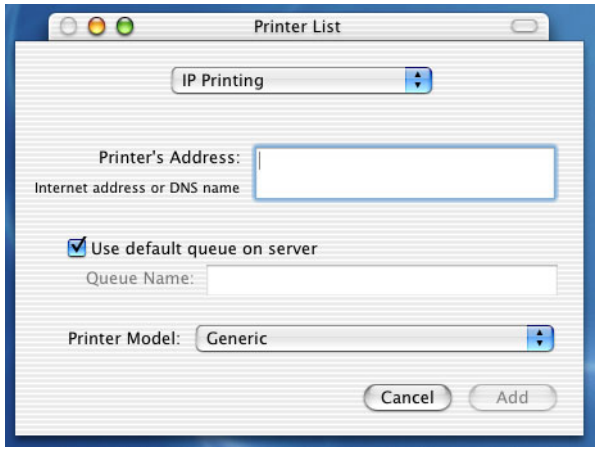


Fig. 6-3: Select TCP/IP printer

4. Enter the IP address or the host name of the print server in the 'Printer's Address' box.
5. Disable 'Use default queue on server'.
6. Enter a logical printer (lp1 - lp8) into the 'Queue Name' box. With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4). If you always want to print via the logical printer no. 1, you can enter an arbitrary name.
7. Select a suitable printer model for your printer.
   The following window appears:

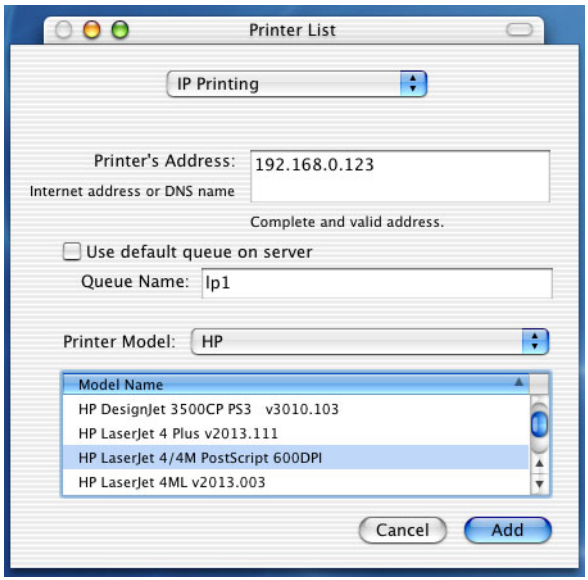


Fig. 6-4: TCP/IP printer with necessary entries

8. Click 'Add.'
   The following window appears:

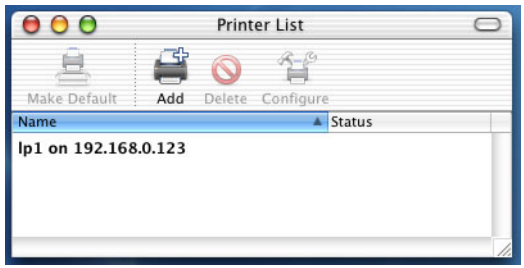


Fig. 6-5: Installed print server

6.1.3 Configuring the Print Server

After the print server installation, the print server can be configured. This means that the print server name or the logical printer may be changed, for example.

In order to configure the print server, you can use either the print server homepage, the PRINTSERVER-NetTool, or the FTP parameter transfer.

For more information, please read the relevant section in the User Manual.

6.2 Installation in Mac OS 9/8 Networks

6.2.1 Basic Principles

For the most part, the PRINTSERVER is automatically installed in Mac OS 9/8 networks. To configure and administer the print server, an additional virtual printer with a name expanded by '_ADM' is installed.

Which Protocols are Used?

The print server works in AppleTalk networks. Depending on the network type, EtherTalk and TokenTalk are supported.

What Happens During Installation in Apple Networks?

After the print server is turned on, it initializes. In the process, the print server determines its AppleTalk address. If the print server has already been in use, it uses the last address. If zones are used in your network, the print server will assign the default zone. In a last step, the system will check whether the print server name already exists in the network. If this is the case, the name will be expanded automatically (e.g.: Apple -> Apple_1 to Apple_999).

Pocket and Box Print Servers in Apple Networks

All pocket and box print servers support the Adobe protocols TBCP and BCP. These protocols allow you to print in the so-called binary mode with suitable PostScript printers. The relevant protocol can be chosen using the 'apple_encode' parameter. The TBCP protocol is used as default setting.

Bidirectional Communication

All print servers support bidirectional communication between the printer and the host. The print server forwards all requests directly to the printer or host, so that a direct communication between the host and the printer is possible. The bidirectional communication is used as default setting. Using the 'apple_bidi' parameter, the bidirectional communication for pocket and box

print servers may also be disabled, if it is not supported by the printers that are connected to the parallel interface.

6.2.2 Installing the PRINTSERVER

Proceed as follows:

1. Select 'Chooser' on the Apple menu.
   The following window appears:

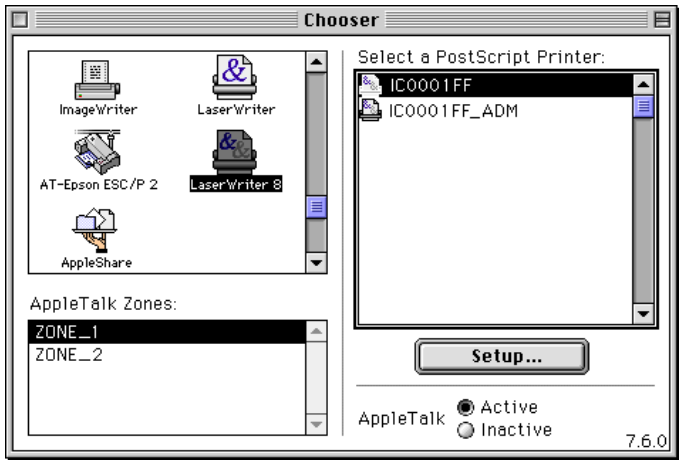


Fig. 6-6: 'Chooser' window

As for box print servers, several print servers appear, one for each port, e.g. IC0001FF_LPT1, IC0001FF_COM1 or IC0001FF_USB1. Each print server must be installed separately by following the steps described in this section.

2. Select the desired printer driver.
3. Select the corresponding zone, if required.
4. Double-click the print server in the 'Select a PostScript Printer' box.

6.2.3 Installing the Virtual Printer

Proceed as follows:

1. Select 'Chooser' on the Apple menu.
2. Select the printer driver 'LaserWriter 8'.
3. Double-click the virtual printer in the 'Select a PostScript Printer' box.
   Example: IC0001FF_ADM
   The following window appears:

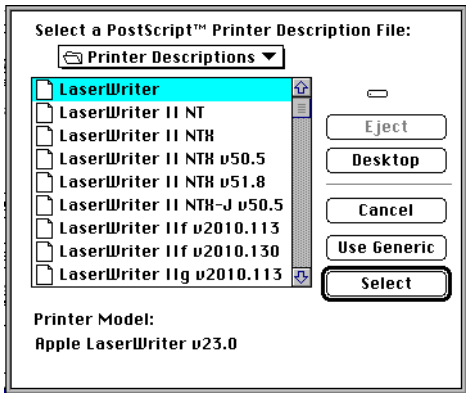


Fig. 6-7: 'Select Printer Description File' window

4. Click 'Use Generic'.

6.2.4 Configuring the Print Server

After the print server installation, the print server can be configured via a virtual printer. This means that the print server name or the zone might be changed, for example.

In pure Apple networks, the print server can be configured and administered via a text file. This is why in Apple networks every print server additionally appears as virtual printer with a name expanded by '_ADM'. A text file is sent to this virtual printer as a print job. The print server analyses the text file, reads, and saves new parameter values. Afterwards, the print server is restarted automatically. The text file will not be printed, however.

By means of the text file, all parameters which are contained in the 'parameters' configuration file can be set. For more information, please read the "Print Server Parameters" chapter in the User Manual.

In Apple networks in which TCP/IP is used, it is advisable to save the IP address on the print server by means of the text file and to then use the print server homepage to configure the print server. For more information, please read the "Print Server Homepage" chapter in the User Manual.

Creating the Text File

The text file should be created using a rather simple Editor, such as the "Notepad." The parameter name and its corresponding value are shown in one line of the text file and are separated by an equals sign. The spelling of the parameter name has to correspond to the one in the 'parameters' configuration file. No Apple-specific special characters or equals signs are to be used for the parameter values.

Example for a Text File

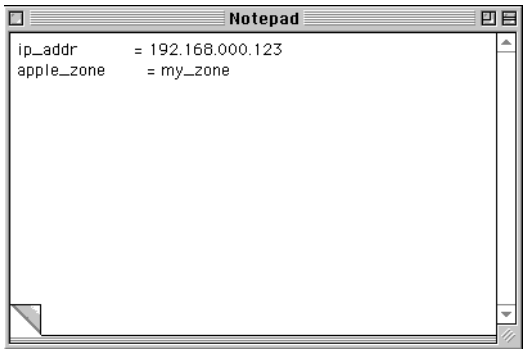


Fig. 6-8: Example for a Text File

Text file for Password-Protected Print Servers

To administer a print server that is protected by a password, the 'login' parameter and the password have to be indicated at the beginning of the text file.

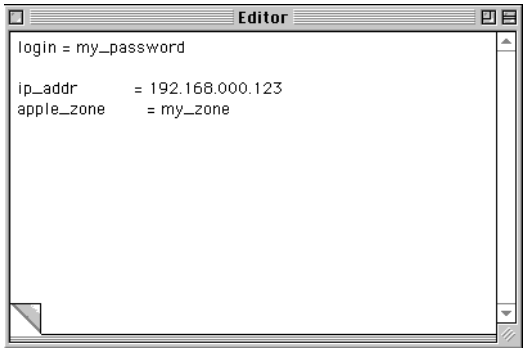


Fig. 6-9: Text file for Password-Protected Print Servers

Deleting a password

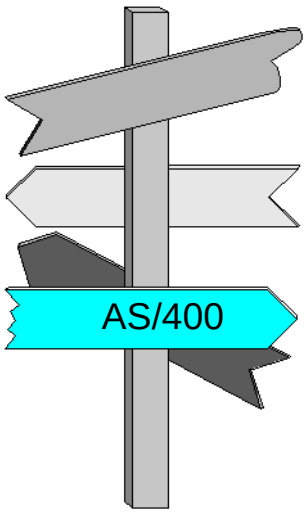
By means of the text file, you can delete a password that was assigned to a print server. To do this, the text file has to contain the following two lines:

Fig. 6-10: Deleting a password

Once again, the 'login' parameter has to be indicated at the beginning of the text file.

CHAPTER 7

Installation in AS/400 Networks



This chapter contains information concerning the following topics:

- Basic Principles
- Creating a Remote Output Queue
- Creating a Device Description

7.1 Basic Principles

The print servers fully support the SCS data stream of the IBM AS/400/iSeries. For IPDS data, only the conversion of fonts is possible. Other IPDS features still have to be converted using special data stream converters that are switched between the print server and the printer.

In AS/400 networks there are two ways to operate network printers:

- using a remote printer queue (RMTPRTQ)
- using a device description

In both cases the print-out is carried out via the AS/400/iSeries spool output system.

We would recommend that you add the attribute SAVE(*YES) to printer files (PRTF) or spool files (SPLF) that are printed on printers with large storage capacity (e.g. PC printers). This avoids the loss of spool files in case of a printer fault.

Device Description

Starting with OS/400 V3R7, network printers can be connected to an enhanced device description via IP. To this purpose, special entries are made in the device description for the keywords DEVCLS(*LAN), LANATTACH (*IP) and RMTLOCNAME. As in the case of locally connected printers, error messages from the printer will accumulate in a message queue so that the printout can easily be controlled.

To use this integration method, the Print Service Facility OS/400 (5769TC1 TCP/IP Connectivity Utilities) license program, which is available as standard feature with Release 3.7 and later has to be installed.

When the network printer is integrated via a device description, the IBMSNMPDRV driver is supported. This driver allows bidirectionality in the case of external print servers.

Remote Printer Queues

Starting with OS/400 V4R2, network printers can be addressed directly via a specially defined output queue (*OUTQ) without having to create a device description (*DEVD) for the printer. This can be done using the keywords RMTSYS and RMTPRTQ of the CRTOUTQ command. These keywords define a remote printer with the same name as the output queue. The remote printer can be started using the OS/400 command STRRMTWTR.

The disadvantage of this kind of installation under OS/400 V4 is that the AS/400 does not receive the current printer status messages from the network printer and the administration options are considerably restricted. These restrictions are not caused by the print server but by the IP print mechanisms (lpr) used in the AS/400/iSeries. Starting with OS/400 V5R1, the IBM iSeries support IPP (Internet Printing Protocol) that allows the forwarding of detailed messages from the printer to the message queue.

For further information, please read the section "Basic TCP/IP Terminology" on page 1-7.

Administrator Rights

In order to configure a network printer, the user must have *IOYSCFG special authority. This may be the AS/400 security officer (QSECOFR) or a specially defined user profile.

For further information about the *IOSYSCFG special authority, please consult the relevant AS/400/iSeries documentation.

Procedure

Which procedures can be selected?

- Creating a Remote Output Queue
- Creating a Device Description

7.2 Creating a Remote Output Queue

The installation involves the following steps:

- Saving the IP Address in the Print Server
- Checking the IP Connection
- Creating a Remote Output Queue
- Starting the Remote Printer Writer

7.2.1 Saving the IP Address in the Print Server

In pure AS/400 network environments, the IP address cannot be assigned using arp and ping since the arp command is not available. Use other options to save the IP address such as the PRINTSERVER-NetTool.

For more information, please read the section "Methods of Saving the IP Address in the Print Server" on page 1-8.

7.2.2 Checking the IP Connection

Make sure that the print server will be recognized in the network by the AS/400/iSeries.

Proceed as follows:

1. Enter the following command into the OS/400 command line:
   PING' <IP address or host name of the print server>'
   The result of the connection will be displayed.

The IP address or the host name must be put in single quotation marks.

If a connection cannot be achieved, check the network cabling and the IP connection of the print server from a PC. Make sure that the required TCP servers are started on the AS/400/iSeries.

7.2.3 Creating a Remote Output Queue

A remote output queue is created using the CRTOUTQ command. Depending on the release version of the OS/400, the keywords and parameters for the creation of an output queue may differ slightly from the following description.

Before creating a remote output queue, make sure that there is no other output queue with the same name.

Proceed as follows:

1. Log in using a user profile.
   This user profile has *IOSYSCFG special authority. (alternatively QSECOFR).
2. Enter the following command:
   CRTOUTQ
3. Press the Enter key.
   The following window appears:

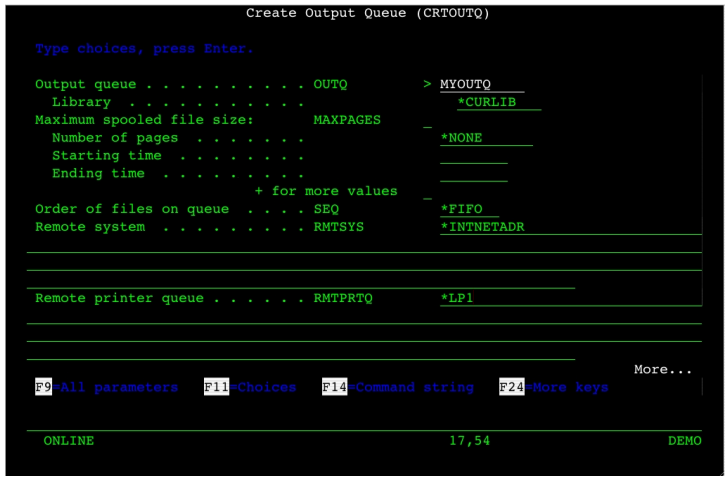

Create Output Queue (CRTOUTQ)
Type choices, press Enter.
Output queue . . . . . OUTQ > MYOUTQ
Library . . . . . *CURLIB
Maximum spooled file size: MAXPAGES
Number of pages . . . . . *NONE
Starting time . . . . . .
Ending time . . . . . .
+ for more values
Order of files on queue . . . . SEQ *FIFO
Remote system . . . . . RMTSYS *INTNETADR
Remote printer queue . . . . . RMTPRTQ *LP1
More...
F9=All parameters F11=Choices F14=Command string F24=More keys
ONLINE 17,54 DEMO

Fig. 7-1: 'Create Output Queue' Part 1

4. Press F11.
   The command keywords are displayed.
5. Enter the following parameters into the mask:
   OUTQ <name of the output queue>
   e.g. MY_OUTQ
   library *QUSRSYS or *CURLIB
   RMTSYS *INTNETADR
6. Press F11.
7. Enter the following parameter into the mask:
   RMTPRTQ <logical printer> e.g. lp1

With box print servers, the port is addressed via the logical printer (see section "Logical Printers" on page 1-4).

8. Press the page down key.
   The following window appears:

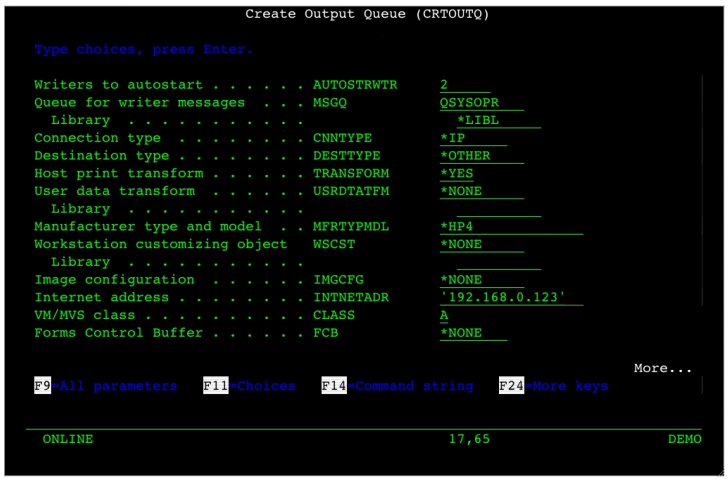

Create Output Queue (CRTOUTQ)
Type choices, press Enter.
Writers to autostart . . . . . AUTOSTRWTR 2
Queue for writer messages . . . MSGQ QSYSOPR
Library . . . . . *LIBL
Connection type . . . . . CNNTYPE *IP
Destination type . . . . . DESTTYPE *OTHER
Host print transform . . . . . TRANSFORM *YES
User data transform . . . . . USRDTATFM *NONE
Library . . . . . *LIBL
Manufacturer type and model . . MFRTYPMDL *HP4
Workstation customizing object WSCST *NONE
Library . . . . . *LIBL
Image configuration . . . . . IMGCFG *NONE
Internet address . . . . . INTNETADR '192.168.0.123'
VM/MVS class . . . . . CLASS A
Forms Control Buffer . . . . . FCB *NONE
More...
F9=All parameters F11=Choices F14=Command string F24=More keys
ONLINE 17,65 DEMO

Fig. 7-2: 'Create Output Queue' Part 2

9. Enter the following parameters into the mask:

AUTOSTRWTR	<number of WTR jobs to be started> e.g. 2 (from 1-10)
CNNMTYPE	*IP
DESTTYPE	*OTHER
TRANSFORM	*YES
MFRTYPMDL	<manufacturer printer type and model> e.g. *HP4
INTNETADR	'<IP address or host name of the print server>' e.g. '192.168.0.123'

The IP address or the host name must be put in single quotation marks.

HP 4 may be entered under MFRTYPMDL for printers supporting the PCL5 data stream.

Further data of the output queue can be used alternatively. We recommend that you choose a significant description for the keyword TEXT.

10. Press the Enter key.
    The installation of a remote output queue has been completed successfully.

7.2.4 Starting the Remote Printer Writer

The printer writer for a remote output queue is started using the STRRMTPRT command.

Proceed as follows:

1. Enter the following command at the system console:
   STRRMTPRT <name of the output queue>
   Example: STRRMTPRT MY_DEVICE

   If the printer writer has already been started you will receive a message.

Alternatively, you can give details about message queues (MSGQ) and restrictions of form types (FORMTYPE).

7.2.5 Troubleshooting

There may be various reasons that a print job cannot be printed.

Problem	Action
The remote printer writer is not started.	Start the remote printer writer using the STRRMTWTR command <name of the output queue>. Note: Printer writers for remote output queues cannot be displayed using the WRKWTR command.
The output queue is held.	View all output queues using the OS/400 command WRKOUTQ *ALL. The status of the output queue should be RLS (released). If the status is HDL (held), release the output queue by entering 6.
The spool files are not released.	View the contents of the output queue using the WRKOUTQ command <name of the output queue>. If the status of the first spool file to be printed is HDL (held), release the file by chosing 6. The status will change from *RLS to SND (send). Once the file is printed it will be deleted from the list or will change to the status SAV (save).

7.3 Creating a Device Description

The installation involves the following steps:

- Saving the IP Address in the Print Server
- Checking the IP Connection
- Creating a Device Description
- Attaching the Device Description
- Starting the Printer Writer

7.3.1 Saving the IP Address in the Print Server

In pure AS/400 network environments, the IP address cannot be assigned using arp and ping since the arp command is not available. Use other options to save the IP address such as the PRINTSERVER-NetTool.

For more information, please read the section "Methods of Saving the IP Address in the Print Server" on page 1-8.

7.3.2 Checking the IP Connection

Make sure that the print server will be recognized in the network by the AS/400/iSeries.

Proceed as follows:

1. Enter the following command into an OS/400 command line:
   PING' <IP address or host name of the print server>'
   The result of the connection will be displayed.

The IP address or the host name must be put in single quotation marks.

If a connection cannot be achieved, check the network cabling and the IP connection of the print server from a PC. Make sure that the required TCP servers are started on the AS/400/iSeries.

7.3.3 Creating a Device Description

A remote device printer may be created using the CRTDEVPRT command. Depending on the release version of the OS/400, the keywords and parameters for the creation of a device description may differ slightly from the following description (V5R1).

Before creating a device description, make sure that there is no other device with the same name.

Proceed as follows:

1. Log in using a user profile.
   This user profile has *IOSYSCFG special authority. (alternatively QSECOFR).
2. Enter the following command:
   CRTDEVPRT
3. Press F4.
   The command prompt is displayed.

4. Press F9.
   The following window appears:

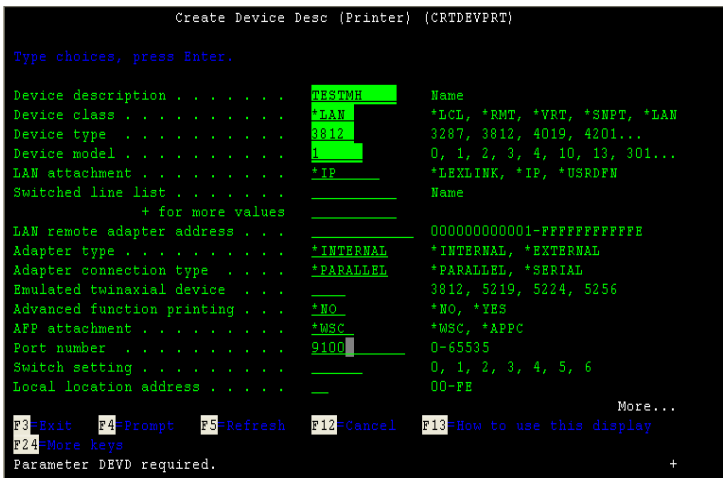

Create Device Desc (Printer) (CRTDEVPRT)
Type choices, press Enter.
Device description . . . . . TESTMH Name
Device class . . . . . *LAN *LCL, *RMT, *VRT, *SNPT, *LAN
Device type . . . . . 3812 3287, 3812, 4019, 4201...
Device model . . . . . 1 0, 1, 2, 3, 4, 10, 13, 301...
LAN attachment . . . . . *IP *LEXLINK, *IP, *USRDFN
Switched line list . . . . . Name
+ for more values
LAN remote adapter address . . . 000000000001-FFFFFFFFFFFE
Adapter type . . . . . *INTERNAL *INTERNAL, *EXTERNAL
Adapter connection type . . . . *PARALLEL *PARALLEL, *SERIAL
Emulated twinaxial device . . . 3812, 5219, 5224, 5256
Advanced function printing . . . *NO *NO, *YES
AFP attachment . . . . . *WSC *WSC, *APPC
Port number 9100 0-65535
Switch setting 0, 1, 2, 3, 4, 5, 6
Local location address 00-FE
More...
F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
F24=More keys
Parameter DEVD required.

Fig. 7-3: 'Create Device Description (Printer)' Part 1

If the command keywords are not displayed, press F11.

5. Enter the following parameters into the mask:

DEVD	<arbitrary name> e.g. TESTMH
DEVCLS	*LAN
TYPE	3812
MODEL	1
LANATTACH	*IP
AFP	*NO

   PORT 9100 or 9101 to 9104 with box print servers

6. Press the page down key.
   The following window appears:

```
                    Create Device Desc (Printer) (CRTDEVPRT)

Type choices, press Enter.

Auxiliary printer . . . . . ____          *YES, *NO
Emulating ASCII device . . . . . *NO      *NO, *YES
Physical attachment . . . . . _______     *DIRECT, *PTT, *MODEM...
Online at IPL . . . . . *YES              *YES, *NO
Attached controller . . . . . _________   Name
Language type . . . . . *SYSVAL           *SYSVAL, AGB, AGI, ALI...
Print quality . . . . . *STD              *STD, *DRAFT, *NLQ
Font:
  Identifier . . . . . 011                3, 5, 11, 12, 13, 18, 19...
  Point size . . . . . *NONE              000.1-999.9, *NONE
Form feed . . . . . *TYPE                 *TYPE, *CONT, *CONT2, *CUT...
Separator drawer . . . . . *FILE          1-255, *FILE
Separator program . . . . . *NONE         Name, *NONE
  Library . . . . . _________             Name, *LIBL, *CURLIB
Number of drawers . . . . . _             1, 2, 3
Printer error message . . . . . *INQ      *INQ, *INFO
                                                                    More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Fig. 7-4: 'Create Device Description (Printer)' Part 2

7. Enter the following parameter into the mask:
   FONT 011
8. Press the page down key.
   The following window appears:

```
                    Create Device Desc (Printer) (CRTDEVPRT)

Type choices, press Enter.

Message queue . . . . . *CTLD             Name, *CTLD, *SYSOPR, QSYSOPR
  Library . . . . . _________             Name, *LIBL, *CURLIB
Maximum length of request unit  *CALC     *CALC
Application type . . . . . *NONE          *NONE, *NRF, *DEVINIT...
Activation timer . . . . . 2550           1-2550, *NOMAX
Inactivity timer . . . . . *SEC15         1-30, *ATTACH, *NOMAX...
SNA pass-through device desc . . *NONE    Name, *NONE
SNA pass-through group name  . . *NONE    Name, *NONE
Host signon/logon command  . . . *NONE
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________
Pacing . . . . . 7                        1-7
Line speed . . . . . *TYPE                *TYPE, 150, 300, 600, 1200...
Word length . . . . . *TYPE               *TYPE, 7, 8
Type of parity . . . . . *NONE            *TYPE, *EVEN, *ODD, *NONE...
                                                                    More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Fig. 7-5: 'Create Device Description (Printer)' Part 3

9. Enter the following parameters into the mask:

ACTTMR	2550
INACTTMR	*SEC30

If the printer is used solely with the AS/400/iSeries, you can also enter the parameter value *NOMAX for the keyword ACTTMR.
In this case, the printer will not be released by the AS/400/iSeries at the end of the print-out.

10. Press the page down key.
The following window appears:

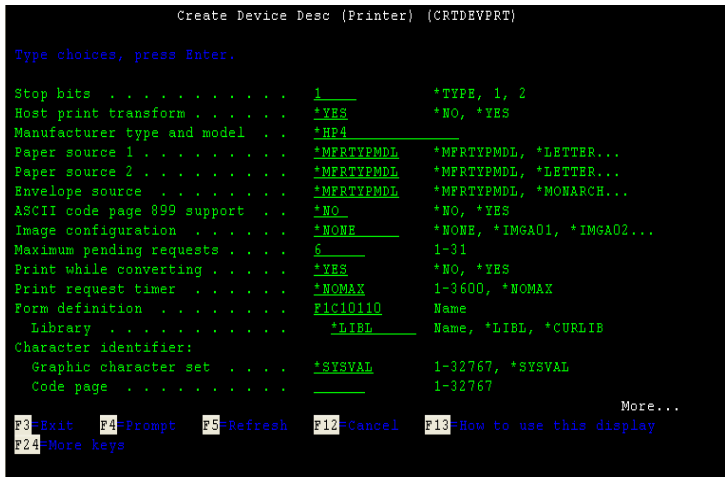

Create Device Desc (Printer) (CRTDEVPRT)
Type choices, press Enter.
Stop bits . . . . . 1 *TYPE, 1, 2
Host print transform . . . . . *YES *NO, *YES
Manufacturer type and model . . *HP4
Paper source 1 . . . . . *MFRTYPMDL *MFRTYPMDL, *LETTER...
Paper source 2 . . . . . *MFRTYPMDL *MFRTYPMDL, *LETTER...
Envelope source . . . . . *MFRTYPMDL *MFRTYPMDL, *MONARCH...
ASCII code page 899 support . . *NO *NO, *YES
Image configuration . . . . . *NONE *NONE, *IMGA01, *IMGA02...
Maximum pending requests 5 1-31
Print while converting . . . . . *YES *NO, *YES
Print request timer . . . . . *NOMAX 1-3600, *NOMAX
Form definition . . . . . P1C10110 Name
Library . . . . . *LIBL Name, *LIBL, *CURLIB
Character identifier:
Graphic character set . . . . *SYSVAL 1-32767, *SYSVAL
Code page 1-32767
More...
F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
F24=More keys

Fig. 7-6: 'Create Device Description (Printer)' Part 4

11. Enter the following parameters into the mask:

TRANSFORM	*YES
MFRPRTYPMDL	<manufacturer printer type and model> e.g. *HP4
PRTCVT	*YES

HP 4 may be entered under MFRTYPMDL for all printers supporting the PCL5 data stream.

12. Press the page down key.
    The following window appears:

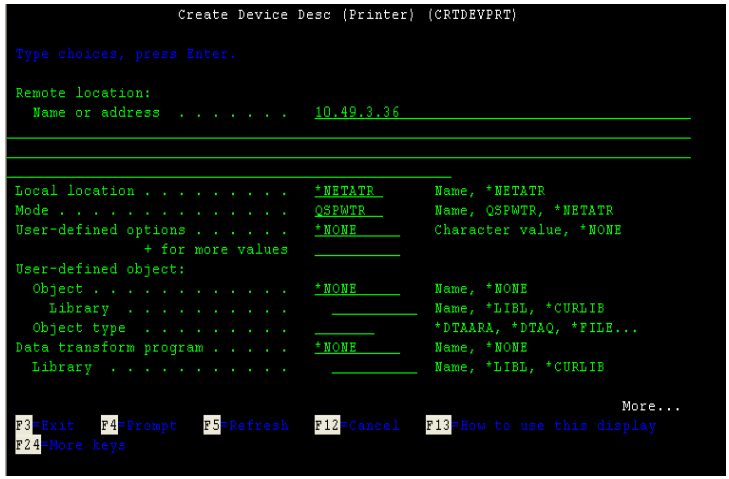

Create Device Desc (Printer) (CRTDEVPRT)
Type choices, press Enter.
Remote location:
Name or address 10.49.3.36
Local location . . . . . *NETATR Name, *NETATR
Mode . . . . . QSPWTR Name, QSPWTR, *NETATR
User-defined options . . . . . *NONE Character value, *NONE
+ for more values
User-defined object:
Object . . . . . *NONE Name, *NONE
Library . . . . . Name, *LIBL, *CURLIB
Object type . . . . . *DTAARA, *DTAQ, *FILE...
Data transform program . . . . . *NONE Name, *NONE
Library . . . . . Name, *LIBL, *CURLIB
More...
F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
F24=More keys

Fig. 7-7: 'Create Device Description (Printer)' Part 5

13. Enter the following parameter into the mask:
    RMTLOCNAME '<IP address or host name of the print server>'
14. Press the page down key.
    The following window appears:

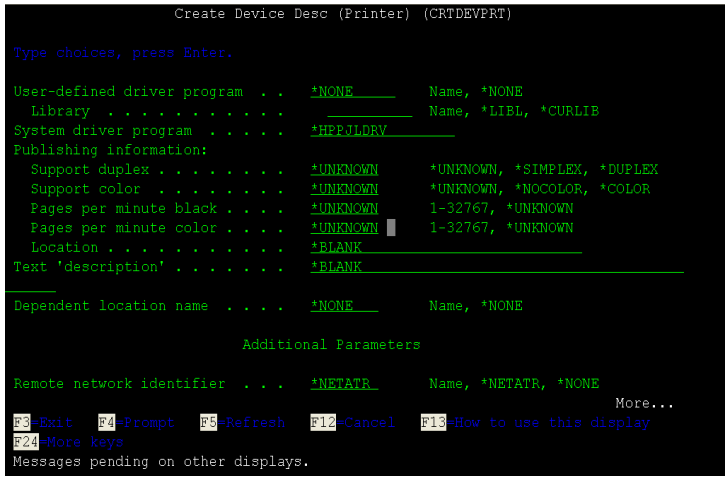

Create Device Desc (Printer) (CRTDEVPRT)
Type choices, press Enter.
User-defined driver program . . *NONE Name, *NONE
Library . . . . . Name, *LIBL, *CURLIB
System driver program . . . . . *HPPJLDRV
Publishing information:
Support duplex . . . . . *UNKNOWN *UNKNOWN, *SIMPLEX, *DUPLEX
Support color . . . . . *UNKNOWN *UNKNOWN, *NOCOLOR, *COLOR
Pages per minute black . . . . *UNKNOWN 1-32767, *UNKNOWN
Pages per minute color . . . . *UNKNOWN 1-32767, *UNKNOWN
Location . . . . . *BLANK
Text 'description' . . . . . *BLANK
Dependent location name . . . . *NONE Name, *NONE
Additional Parameters
Remote network identifier . . . *NETATR Name, *NETATR, *NONE
More...
F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display
F24=More keys
Messages pending on other displays.

Fig. 7-8: 'Create Device Description (Printer)' Part 6

15. Depending on the printer type, enter the following parameters into the mask under SYSDRVPGM:
    - for printers supporting PJL: *HPPJLDRV
    - for IBM network printers: *IBMPJLDRV
    - for printers supporting SNMP: *IBMSNMPDRV

    Further details of the device description can be used alternatively. We recommend that you choose a significant description for the keyword TEXT.

16. Press the Enter key.
    The device description is created.

7.3.4 Attaching the Device Description

Proceed as follows:

1. Check whether the device description is attached:
   WRKCFGSTS *dev <arbitrary name>
2. If the status is "detached", attach the device by entering 1.

7.3.5 Starting the Printer Writer

Proceed as follows:

1. Enter the following command:
   STRPRTWTR<arbitrary name>
   The printer writer is started.
2. Make sure that the status of the output queue is RLS. Release the output queue using the RLSWTR command, if necessary.
   The installation has been completed successfully.

7.3.6 Troubleshooting

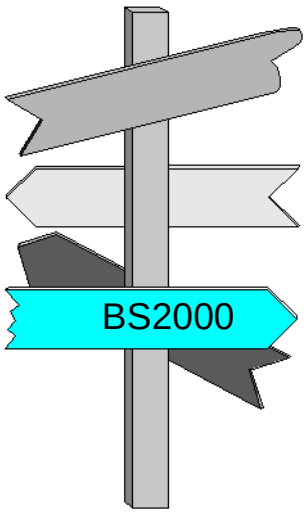
There may be various reasons that a print job cannot be printed.

Problem	Action
The print device is not attached.	Check the status of the device using the WRKCFGSTS command as described in the section "Attaching the Device Description" on page 7-17.

Problem	Action
The printer writer is not started.	Start the program using the STRPRTWTR command.
The output queue is held.	Check the status of the output queue (status HLD). Release the output queue using the RLSOUTQ command.
The output file is held.	View the contents of the output queue using the WRKOUTQ command and release the spool file by entering 6.
A printer message is pending.	View the contents of the output queue using the WRKOUTQ command. If the status MSG is shown for an ouput queue to be printed, view the message by entering 7 and answer it.

CHAPTER 8

Installation in BS2000 Networks



This chapter contains information concerning the following topics:

- Basic Principles
- Saving the IP Address in the Print Server
- Installing a Print Server for TCP/IP
- Entering the IP Address
- Installing the Print Server in the RSO Spooler
- Defining the TCP/IP Port

8.1 Basic Principles

Network printers are integrated into BS2000 networks by means of a direct TCP/IP connection. By means of TCP/IP ports, the print data can be transferred from the spooler to the PRINTSERVER. For this purpose, you must configure the port number. To do this, you must install a printer port and enter the port number. With BS2000 systems, the TCP/IP port 2900 is used to implement a bidirectional socket connection.

For more information, please read the section "TCP/IP Ports" on page 1-15.

Procedure

The installation involves the following steps:

- Saving the IP Address in the Print Server
- Installing a Print Server for TCP/IP
- Entering the IP Address
- Installing the Print Server in the RSO Spooler
- Defining the TCP/IP Port

8.2 Saving the IP Address in the Print Server

In order to save the IP address in the print server, the ARP table must be edited first (see also the section "ARP-Tabelle" on page 1-15). After that, the 'ping' command is used to send the IP address to the print server, where it is saved.

Use the 'arp' and 'ping' commands to save the IP address if your network has no superordinate management of IP addresses and host names. For more information, please read the section "Möglichkeiten zum Speichern der IP-Adresse im Printserver" on page 1-8.

Proceed as follows:

1. Edit the ARP table:
   Syntax: arp -s <IP address> <hardware address>
   Example: arp -s 192.168.0.123 00:c0:eb:00:01:ff
2. Assign a new IP address to the print server:
   Syntax: ping <IP address>
   Example: ping 192.168.0.123

8.3 Installing a Print Server for TCP/IP

Install a print server for TCP/IP. In the process, follow the instructions in the documentation of your BS2000 system.

8.4 Entering the IP Address

Proceed as follows:

1. Enter the IP address by means of a DCAM command.
   Syntax: /BCIN <name of processor>,<IP address>
   Example: BCIN my_system,192.168.0.123

8.5 Installing the Print Server in the RSO Spooler

The IP address of the PRINTSERVERS and TCP/IP port 2900 must be entered into the RSO spooler. The SPSERVE utility program is available for this purpose.

Proceed as follows:

1. Call the SPSERVE utility program.
2. Enter the IP address and TCP/IP port 2900 into the RSO spooler as the printer.
3. Enter '9000-PCL' as the printer type, for example.

8.6 Defining the TCP/IP Port

Proceed as follows:

1. Define the TCP/IP port:
   Syntax: /BCMAP <printer>,<processor>,Port=2900
   Example: /BCMAP my_printer,my_system,Port=2900

REFERENCE A

Shell Scripts

A.1 Basic Principles

The following topics will be described:

- Function of Shell Scripts
- Description of Variables

A.2 Function of Shell Scripts

In UNIX networks, you can use shell scripts to print when remote printing via the LPD protocol and printing via direct TCP/IP ports are not possible. The *.sh shell scripts are sample scripts for the default printer interfaces of the 'lpsched,' 'lpd,' and 'qdaemon' spoolers supported by the print server.

The following shell scripts are available:

- aix.sh (for AIX systems)
- bsd.sh (for BSD systems)
- sys5.sh (for System V)

Before you can print via shell scripts, you must first transfer them from the print server and then adapt them to the respective UNIX network. For more information, please read the section "Printing via Shell Scripts" on page 5-25.

The following chapter deals with the basic functions of these shell scripts.

Transfer of Print Data

At the beginning of the shell script, a few variables are initialized. The print data is gathered in a temporary file ('/tmp/xxx.d') and then transferred to the print server via FTP. In the process, the name of the FTP target file determines the printer port of the print server. The transfer mode of the FTP server preset in the shell script is binary to suppress the conversion of LF to CR+LF and thus to make the correct transfer of graphic data possible. For the proper output of text data, this conversion must therefore be carried out in the printer itself.

End of Print Job

When all data has been transferred, the print server sends the '226 Transfer complete' message to the FTP server. In this case, the

shell script comes to an end and informs the spooler of the correct completion of the print job by means of a return value of '0.' If the printer port is already occupied because another printer is currently printing, for example, the print server sends the '552 No print slot available' message to the FTP server. The further processing of the shell script depends on the initialization of the MAXR variables. When the shell script has come to an end without the data having been able to be printed, a return value of '129' (V UNIX or AIX systems) or '1' (BSD UNIX) indicates that the print job must be repeated.

Log Files in Case of Error

The operating sequence of the print job will be recorded in a log file having the name of the printer and the extension '.last' in the '/tmp' directory. This file contains, among other things, the start time of the print job, the parameters with which the printer interface was called, and the output of the FTP command. In case of an error, this data provides information concerning the causes of the error.

Printing of a Banner Page

If you print via shell scripts, you can print a banner page. In the process, the 'nobanner' variable, which is initialized with 'no,' must be set to 'yes' by means of the '-o nobanner' variable of the 'lp' command.

This banner page cannot be used for PostScript printing. When a PostScript printer is connected, the output of the banner page must therefore be suppressed. This is achieved by initializing the 'nobanner' and 'nofilebreak' variables with 'yes.'

A.3 Description of Variables

In this section, the variables of the shell scripts which must or can be changed are described.

HOST Contains the host name or IP address of the print server, such as HOST=IC0001FF.

PORTS Indicates the logical printer. The 'PORTS=lp1, lp2, lp3, lp4, lp5, lp6, lp7, lp8' presetting specifies all logical printers of the print server. Select the desired logical printer and delete the others. By means of the 'PORTS=lp1' default setting, for example, the printing sequence will be carried out by means of logical printer no.1. For more information, please read the section "Logical Printers" on page 1-4.

FTP Indicates the complete path of the FTP command. This path depends on the respective UNIX System, such as 'FTP=/usr/bin/ftp' for System V or AIX, and 'FTP=/usr/ucb/ftp' for BSD.

WAIT Indicates the waiting period in seconds after which the print job is repeated. This value can usually remain unchanged.

MAXR Contains a loop counter. This counter determines the behavior of the shell script when the print data could not be transferred because, for example, the desired printer port is currently occupied. In case of a presetting of MAXR=10, the system will wait a maximum of 1024 seconds, that is, approx. 15 minutes, for the desired printer port to be free.

When MAXR has been initialized with a value of zero, the shell script will come to an end. When MAXR has been initialized with

a value greater than zero, another attempt will be made to send the data to the printer via FTP. After every attempt, the loop counter will be decremented and the waiting period will be doubled. This will be repeated until the data have been able to be printed or MAXR has reached a value of '0,' and the shell script has come to an end. When MAXR has been initialized with a value of '-1,' the shell script will come to an end only if the data have been able to be printed.

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